

# Safety Rules for Students at the University of Ljubljana - Faculty of Chemistry and Chemical Technology (UL FKKT)

Year 1



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## **1. THE HISTORY OF HEALTH AND SAFETY AT WORK**

For ages, people have been faced with potential sources of injury or damage – and ways of protecting themselves – in all walks of life, especially in occupational environments. Written sources from history prove that safety and health at work is not simply a product of the last couple of years:

1. An ancient Chinese document titled "Ping Yuan Hon Lum" contains a warning about the hazards of wood. The cited example pertains to the Chinese lacquer tree (*Rhus vernicifera*), which was used to produce lacquer.
2. Around 400 BC, Hippocrates warned that certain craft work and technical skills may lead to health issues. In his medical research, he classified them as occupational impairments.
3. In 1531, Paracelsus studied silicosis and other mining maladies, as well as illnesses caused by lead and mercury.
4. In 1746, a Dutch inventor named Goldschmiedt invented the thimble as a means to protect the fingers from needles while sewing.
5. In 1785, the introduction of the steam engine in textile plants launched the industrial revolution in England.
6. A document titled "Guidelines for Foremen" (*Smernice delovanju oddelkovodij*), used in the first nail-making and iron-craft cooperative in Kropa – Kamna Gorica, undoubtedly had a major influence on Slovenian territories. (The exact date of the document is unknown, but it is estimated to have appeared between 1920 and 1930)

## **2. INTRODUCTION**

During your chemistry studies, you will spend a lot of time in the laboratory. Laboratory exercises are the students' first encounter with practical lab work and the chemicals they will use during future employment. Chemicals are everywhere – at the work place, in urban settings, and in nature. They are used for various purposes in engineering, science, the food industry, agriculture and healthcare. When asking when we actually know enough about a substance and how to safely use it, we quickly find ourselves in a bit of a quandary. Certain types of laboratory exercises can result in accidents or injury at work when carried out improperly. It is the duty of everyone at the Faculty – students and staff alike – to help prevent such unfortunate occurrences.

The goal of teaching students about occupational safety is two-pronged:

- Preventing injury and health hazards which can occur during laboratory exercises, by properly handling laboratory equipment, preparations and devices.
- Teaching students about safety at work procedures at the start of their studies, so the latter become second nature and a routine during future professional life.

### **3. HEALTH AND SAFETY AT WORK**

Health and safety at work (hereinafter: HSW) is a collection of knowledge, procedures, and measures used to ensure a safe and healthy work environment – a prerequisite for a successful worker throughout his or her period of employment.

#### **3.1 LEGISLATION**

The basis for HSW already exists in the Constitution of the Republic of Slovenia, which requires the state to guarantee legal protection for employment and work, while the the right to a healthy living environment is a constitutionally protected right, which naturally also applies to the work environment. This area is regulated by the [Health and Safety at Work Act](#) or ZVZD-1 (Official Gazette of the Republic of Slovenia, No. 43/2011), which is amended by numerous statutory instruments, published on the basis of the Act, as well as other laws regulating health and safety at work for:

- workers exposed to specific risk factors;
- specific categories of "vulnerable workers" (young people);
- workers using specific equipment and
- workers in specific work environments.

The basic principles behind the ZVZD-1 law are based on international regulations on health and safety at work. In this context, it is important to mention the 89/391 EEC Directive and the International Labour Organization's (hereinafter ILO) Convention No. 155 from 1981. Directive 89/391 was adopted on 12 June 1989 with the aim of introducing measures to encourage improvements in the area of HSW. The Directive focuses on: assessing risk, informing workers, training workers, and cooperating with workers when deciding on HSW. The Directive only sets guidelines and serves as the basis for adopting other directives, which apply to risks at the workplace in a more specific manner (e.g. directive on limit values, chemical factors, manual handling of loads, work equipment, etc.). The ILO Convention No. 155 is especially important, since it defines the basic concepts related to health and safety at work, like worker, workplace and health. The Convention defines the obligations of member states, which are required to consult social partners before formulating, adopting and sometimes revising HSW policy.

*Article 9 of ZVZD-1 sets out the basic principles behind HSW:*

- Danger avoidance;
- Risk assessment;
- Management of danger at the source;
- Adapting the work to the individual by adequately organizing the job and work environment, work spaces, work and technological procedures, selecting work and personal safety equipment, as well as work and production methods, and especially by guaranteeing non-monotonous work and working conditions without forced a working rhythm and other circumstances harmful circumstances (humanisation of work);
- Adapting to technical progress;
- Replacing the hazardous with non-hazardous or the less hazardous;
- Developing a comprehensive safety policy, which includes technology, work organization, working conditions, interpersonal relationships and work environment factors;
- Giving precedence to collective safety measures ahead of individual ones;
- Providing workers with adequate instructions and notifications.

These principles give precedence to collective safety measures ahead of individual, general ones.

*Accident at Work*

A work accident is an unforeseen or unexpected workplace or work environment event, which occurs during working hours or stems from a type of work capable of injuring a worker<sup>1</sup>.

*Student Duties Related to Safety at Work at the UL FKKT*

At the UL FKKT, HSW is regulated by the Risk Assessment. Among other things, it establishes the competences and responsibilities of individuals for safety at work. The competences and responsibilities of UL FKKT students include the following:

- Before starting laboratory exercises in the scope of a subject, they must learn about safe work practices, guidelines for safe work, sign a statement confirming they have been informed about the conditions, instructions, and measures pertaining to safe work in the laboratory;
- Before starting their studies at the faculty, they are required to pass a test on safety at work and fire protection;
- They are required to follow instructions related to safety at work and strictly follow the instructions given by superiors;
- They are required to use and maintain personal protective equipment;
- They must provide first aid;
- They must help in case of an accident;
- They must extinguish the fires.

The above competences and responsibilities are quotes from the Risk Assessment and further explained below.

The safety of the students is the responsibility of the teacher. It is the teacher's obligation to inform students about potential injuries and health hazards, as well as about measures for safe work. All students must follow the teacher's instructions and abide by them.

### **3.2 THE UL FKKT RISK ASSESSMENT**

Pursuant to ZVZD-1, the Risk Assessment is the obligation of every employer (in this case, the Faculty). The goal of the Risk assessment is to guarantee in advance that no one will be injured or fall ill because of work. The risk assessment enables us to ascertain whether the work procedure is associated with any dangers; should this be the case, it is our duty to do everything in our power to ensure that the risk is small enough or acceptable. Risk Assessment is therefore obligatory for every employer, regardless of the size of his company or institution; it represents the employer's written programme for ensuring health and safety at work. With the document, the employer clearly expresses that he or she is aware of the responsibility for ensuring health and safety at work, as well as of the potential consequences of failing to follow regulations. The Risk Assessment is therefore the employer's tool used to carefully consider everything which could potentially jeopardize the health and safety of his or her employees. It is aimed at eliminating or reducing dangers with minimal resources. The assessment is also a permanent process used for improving the level and safety and safety culture within a company. It must therefore be continually updated (along with the measures).

### **3.3 LABORATORY SAFETY MEASURES**

In the following pages, we will focus on laboratory safety measures, since laboratory environments present risks for injury and damage to health. However, we must also be aware that danger is present even outside the laboratory (on the steps, during the morning commute to school, when working at the computer, when improperly lifting loads, when roller-skating, etc.). Consequently, safety culture must be cultivated in all areas, not only within educational institutions and other organized activities.

#### **3.3.1 DANGERS IN THE LABORATORY**

The laboratory has many sources of potential danger, such as "permanent" dangers: broken glass, knives and cutting tools, foreign objects in the eye, back injury due to incorrect lifting and electric shock. There are also dangers associated with corrosive, flammable, and radioactive chemicals, as well as uncontrolled chemical reactions.

The main dangers in a laboratory environment come from the following sources:

- Toxic chemicals,
- Flammable reagents,
- Radioactive substances,
- Compressed gases,
- Refrigerated gases,
- Dangerous equipment.

Laboratory equipment can start fires, cause burns and electric shocks, lead to cuts and explosions. Other health risks are associated with toxic substances, which are routinely used in chemical and other laboratories. Under certain conditions, many flammable substances may become explosive.

Laboratories used by students often have a large number of dangerous substances in small quantities. Despite the plethora of chemicals and different equipment used in laboratories, the majority of lab-related injuries comes from glassware, which is why we will first focus on preventing injuries caused by glass fragments.

##### **3.3.1.1 The General Dangers Associated with Laboratory Glassware**

The majority of injuries due to glassware is caused by incorrect use. When the glass shatters, the sharp edges of the fragments can cause cuts. We have to avoid rapid changes in temperature. The glass must be heated gradually and slowly. When heated, it must then be slowly cooled. When handling hot glassware, you must always wear appropriate gloves.

#### **General Rules for Handling Glassware:**

1. Never use broken or scratched glassware. Any faults in the glass almost invariably start on the surface. Glassware exhibiting scratches and notches on the surfaces must be immediately taken out of use.
2. When setting up and inserting laboratory glassware without ground glass joints, we must always use the correct gloves (e.g. the ones shown in Image 1).
3. Never separate the ground glass joints by force. In these cases, it is always ask laboratory personnel for help.

4. Heated glassware must be slowly cooled.
5. Never heat closed glass containers.
6. A vacuum, which reduces pressure, may only be created in specially-designed glassware.
7. When carrying around, we must always hold the glass with both hands.
8. Rubber gloves are used for special cleaning.
- 9.



Image 1: An example of puncture-resistant gloves (Source: ZAVAS Personal Protective Equipment Catalogue)

### 3.3.1.2 Electrical Hazards

At workplaces and in everyday life, we are surrounded by electrical installations and devices carrying or employing electricity.

Laboratories also use various electrical devices. Nowadays, electrical equipment is used for heating, cooling, mixing and pumping, as well as in most instruments used for taking physical measurements.

### 3.3.1.3 The Danger of Electrical Current for the Human Body

A person receives an electric shock when for whatever reason a high enough voltages runs through their body. This most often happens when:

- coming into direct contact with an electrical conductor (phase conductor, part of an electrical device or installation) under sufficient voltage (Image 2);
- touching exposed conductive materials, usually because of faulty insulation or wiring (Image 3).

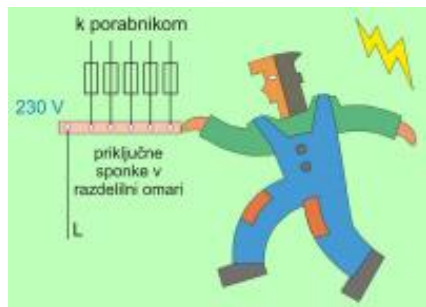


Image 2: Indirect contact

[http://eoet1.evsebine.com/material/eOet1\\_02\\_06\\_02-2.html](http://eoet1.evsebine.com/material/eOet1_02_06_02-2.html)

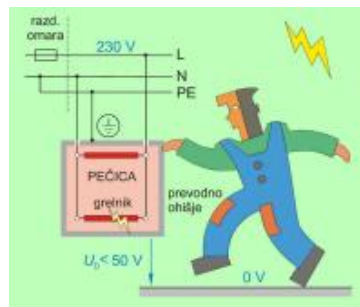


Image 3: Direct contact

The degree or seriousness of the injuries due to electric shock is influenced by various factors:

- . The amplitude (the strength or size) of the current.
- . The type and form of current (an alternating sine wave current damages tissue at certain values, while the same injury would require twice or three-times the direct current).
- . Exposure time.
- . The frequency of the alternating current.
- . The path the electrical current takes through the body (the most dangerous is the path through the heart area).
- . Being prepared for the shock (trials have shown that human beings are more resistant to the effects of current when sleeping than when awake).

A 25 mA current can cause injury to the respiratory system; a current above 50 mA can cause loss of consciousness, while 100 mA means an almost certain death. The consequences also depend on whether we only touch the high-voltage object (we reflexively move the hand) or hold it while the current passes through the heart. A wet finger in contact with 110 V can cause as much as 7–10mA to surge through the body.

The electrical equipment must be installed in such a way as to not be dangerous in case of water or chemical spills. If water or any other chemical spills on the electrical equipment, the device must be switched off immediately and must not be used until cleaned. If an electric shock occurs in wet or humid circumstances, the consequences can be much worse. Wet skin can be much less resistant (even by a factor of 100) compared to when dry. Skin can become wet for various reasons (e.g. because of sweating or spilling liquid).

Repairs on electrical wiring may only be carried out by professional personnel. In case of malfunction, failure or faults on the electrical equipment, you should immediately inform the person conducting and supervising the exercises.

#### **A Few General Rules for Working with Electricity:**

1. Only use an extension cord when strictly necessary and for as short a time as possible. Be sure to put it immediately away after each use.
2. Before using the electrical equipment, be sure to check whether the insulation is intact or missing and whether the wires are not damaged.
3. Any damage or flaws connected with the electrical devices and wiring must be immediately reported to the UL FKKT staff.
4. Make sure that the work surface under the electrical equipment is not wet.
5. Make sure there are no flammable substances nearby.
6. Before plugging into the socket, make sure all the switches on the device are in the off position. This will prevent sparking at the socket.
7. Before cleaning or replacing any components, make sure the switch on the device is in the off position.
8. Never handle electrical equipment with wet or sweaty hands and never stand on wet floors.
9. Never pull the plug forcefully out of the socket.
10. When you finish work, always make sure that all electrical devices have been switched off.

#### **3.3.1.4 Chemical Hazard**

The dangers posed by chemicals are varied and depend on the properties of the substance (flammability, explosiveness, toxicity, corrosiveness, radioactivity, oxidizability, environmental hazardousness, etc.). The classification of chemicals according to their dangerous properties is listed in chapter [3.5](#).



### **General Guidelines for Handling Chemicals in the Laboratory:**

1. Please, take into account that the mixture is at least as dangerous as the sum of its parts.
2. Never use unlabelled chemicals.
3. Always carefully read the labels on the chemical and make sure you've chosen the correct one. Always read the labels three times: when selecting the chemical, just before using it, and after use. Make sure to compare the name, formula and concentration on the labels with the instructions for the exercise.
4. Make sure to immediately label the container with your sample.
5. Never combine substances, except when being explicitly told to do so.
6. Never taste the chemicals. Pipetting with your mouth is prohibited.
7. When working with chemicals, always avoid contact with skin and eyes.
8. Always add acid to water, never the reverse.
9. Never pour water into chemicals heated above 90 °C.
10. If one of the mercury thermometers breaks, report it to the UL FKKT staff.
11. Before using a Bunsen burner, make sure there are no flammable substances nearby.
12. Never pour chemicals down the drain.
13. Never take chemicals out of the laboratory without the prior knowledge of UL FKKT staff.
14. Never place chemicals too close to the edge of the work surface or shelf.
15. Never expose chemicals to heat sources (radiators, sunlight).
16. Do not store chemicals in packaging used for storing food.
17. Always assume all unknown chemicals are dangerous.

### **3.3.2 LABORATORY POLICIES**

The basic rules for safe work are can be found in the Laboratory safety rules of UL FKKT . This applies to all laboratories at the UL FKKT and for everyone in them: teachers, students, cleaning staff and visitors.

The provisions of the Laboratory safety rules of UL FKKT should be read and understood. The entire document may therefore be found in Appendix 1. It is also hung in every laboratory. The individual provisions are further explained under individual chapters.

The Laboratory safety rules of UL FKKT determine only the general rules for working in a laboratory. You will regularly receive specific instructions regarding an individual laboratory or exercise. You are required to follow these instructions, regardless if they are part of the laboratory policies, written work safety instructions or simply oral instructions from the teacher, laboratory assistant or technician. If you fail to follow the instructions, the assistant will ask you to leave the exercises.

### **3.3.3 PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR LABORATORY WORK**

Personal protective equipment refers to protective clothing or other garments or equipment designed to protect the exposed person against injuries or medical impairments. It is strictly forbidden to carry out any work without PPE, if the harmful influences or dangers cannot be overcome in advance using technical and organizational protective measures. The required PPE must be suitably used. Failure to use the required personal protective equipment in all instances where it is needed could result in an accident or occupational disease. Image 4 shows an example of skin burns due to hydrofluoric acid, while Image 5 shows a foreign body in the eye.



*Image 4: Skin injury due to spilling HF acid*  
<http://visionsource.wordpress.com/>



*Image 5: Foreign object in eye*

### Safety Glasses

Safety glasses are used to protect our eyes from mechanical and optical injury, as well as against chemical and liquid sprays. There are several types of safety glasses (hereinafter: glasses) used in laboratory settings:

1. Glasses with side shields,
2. Tightly fitting safety goggles (hereinafter: safety goggles).

Glasses with side shields must be worn at all times in the laboratory. All students wearing prescription glasses and contact lenses must always use safety goggles (Image 7).



*Image 6: Example of glasses with side shields*



*Image 7: Example of safety goggles*

You will have the opportunity to purchase safety glasses before the start of practical laboratory work at the UL FKKT. Some exercises will require additional protection. When handling corrosive substances, safety goggles or a face shield must be worn at all times. Special eyewear is required when working

with lasers. All additional face and eye protection will be available at the laboratory. It is true that glasses can be cumbersome and uncomfortable. However, without them, the pain can be much greater and more permanent.

### 3.3.3.2 Lab Coat

The laboratory coat must be made from 100% cotton; it must have long sleeves and be knee-length or go below the knees. The coat is buttoned up with snap buttons. A white lab coat is recommended. The coat must fit. The coat must be purchased by the students themselves.



*Image 8: Example of a laboratory coat*

### 3.3.3.3 Gloves

The type of gloves can be distinguished according to:

- the type of work (hard work, precise work, etc.);
- the type of danger (cuts, burns, chemicals, etc.);
- size.

During practical laboratory work, you will come across various chemicals and dangers. If the latex gloves turn out to be inappropriate, the laboratory staff will provide you with a different pair.



*Image 9: Gloves for various laboratory tasks*

<http://web.princeton.edu/sites/ehs/labsafetymanual/sec6c.htm#gloves>

#### 3.3.3.4 Footwear

Slippers and sandals are not allowed in the laboratory. The chosen footwear must protect the entire foot and allow you walk surely and safely. High heels and slippery soles are not suitable for laboratory environments.

#### 3.3.3.5 Maintaining PPE

Students are solely responsible for cleaning and maintaining their PPE. Laboratory coats with tears are not allowed.

You are required to regularly clean your glasses or goggles. The glasses and goggles can be satisfactorily cleaned using water; while still wet, they should be wiped using a cotton cloth that doesn't leave behind lint (handkerchiefs made from cloth are perfect). Make sure your glasses have no scratches on the surface. Cracked glasses or goggles and eyewear with damaged frames are not allowed.

### 3.3.4 **HYGIENE**

Laboratories contain plenty of noxious substances. To prevent these substances entering your body, you should always do the following:

1. Carefully wash your hands after working in the laboratory.
2. ***When in the laboratory, never do the following:***
  - Drink and consume food;
  - Smoke (this applies to the entire UL FKKT);
  - Store food and drinks in the lab refrigerators;
  - Keep chemicals in food packaging;
  - Mouth pipetting.

### 3.4 **PROCEDURES IN THE EVENT OF INCIDENTS**

An incident is defined as any event resulting in:

- occupational injury, illness or occupational disease;
- fire and/or an explosion;
- damage to means of action;
- material damage;
- environmental hazard.

When confronted with an incident, you should **immediately** inform the person conducting or supervising the practical laboratory work or other staff at the UL FKKT.

**Because of potential incidents in the laboratory, there should always be at least two people present!**

#### 3.4.1 **MEASURES IN THE EVENT OF AN INCIDENT**

1. Offering first aid if the incident results in an occupational injury.
2. Informing UL FKKT staff about the incident.
3. Following the instructions of UL FKKT staff.

### **3.4.2 FIRST AID**

The following first aid equipment is available:

- First aid kit (Image 10);
- Eyewash fountain (Image 11);
- Emergency showers (Image 12);
- Wash stations in case of corrosive substance spillage (Image 13);
- Defibrillators (Image 14).



*Image 10: FIRST AID kit*



*Image 11: Eyewash fountain*



*Image 12: Emergency shower*



Image 13: Wash stations in case of corrosive substance spillage  
Defibrillator



Image 14:

Before entering the laboratory, you will first get acquainted with the location and use of the equipment pictured above.

#### 3.4.2.1 Procedures for offering first aid in specific cases

The most common injuries in the laboratory requiring first aid:

- Cuts,
- Burns,
- Splash of corrosive substances.

***In the cases above, use the following procedures:***

- CUTS: the site of the cut is cleaned and bandaged (or a plaster is applied).
- BURNS: place under cold water. Never apply any creams.
- SPLASH OF CORROSIVE SUBSTANCES: When skin or the mucus membrane comes into contact with a corrosive substance, it is imperative the site be **washed with water as quickly as possible**. In the event a liquid makes its way into the eye, it should be washed with an eyewash fountain (Image no. 11) for at least 15 minutes; alternatively, use a bottle of Diphoterine® (Image no. 13). In case of a splash onto the skin on the hands or face, the site should be washed with an eyewash fountain and the entire body rinsed under the shower.

**Any eye splashes can be prevented by using safety goggles or a face shield. Gloves and coats should be made from acid-resistant materials.**

### 3.4.3 FIRE, EXPLOSION

The emergency procedures in the event of a fire or explosion are described under [4 – Fire Protection](#).

### 3.4.4 INFORMING ABOUT NEAR MISSES

A near miss is an event that could result in an incident. These irregularities do not result in injury or material damage (e.g. chemical spill without any damage or causing damage to the environment).

You are required to immediately inform UL FKKT staff about a near miss.



## **3.5 HAZARDOUS CHEMICALS**

### **3.5.1 CLASSIFICATION OF HAZARDOUS CHEMICALS**

Pursuant to the Chemicals Act (Official Gazette of the Republic of Slovenia, No. 110/03 – official consolidated text, 47/04 – ZdZPZ, 61/06 – ZBioP and 16/08) and EUROPEAN PARLIAMENT AND COUNCIL REGULATION (EC) No. 1272/2008 from 16 December 2008 on the system of classification, labelling and packaging of chemical substances and mixtures, hazardous chemicals, substances, and preparations are classified into one of the hazard classes.

Hazardous chemicals are classified according to hazard classes:

**a) Explosive chemicals**

Solid, liquid, pasty or gelatinous chemicals, which can undergo an exothermic reaction even in the absence of oxygen in the air, rapidly releasing gases which can detonate under certain conditions, quickly catch fire, or explode as a result of heating and increased pressure when spatially confined.

**b) Oxidizing chemicals**

Chemicals that cause a strong exothermic reaction when coming into contact with other substances (especially flammable ones).

**c) Extremely flammable chemicals**

These include liquid chemicals with an extremely low flashpoint and a low boiling point, as well as gaseous chemicals that are flammable at room temperature and pressure when in contact with air.

**d) Highly flammable chemicals are:**

- Chemicals that heat up when exposed to air and are able to catch fire at room temperature and pressure without supplying external energy;
- Solid chemicals that can catch fire after even minor exposure to an ignition source and then burn and be used up even when the source is removed;
- Liquid chemicals with a very low flashpoint;
- Chemicals that begin emitting flammable gases when in contact with water or its steam.

**e) Flammable chemicals**

Low flashpoint chemicals.

**f) Very toxic chemicals**

Chemicals that cause death or acute or chronic damage to health if ingested, inhaled or absorbed through the skin in very small quantities.

**g) Toxic chemicals**

Chemicals that cause death or acute or chronic damage to health if ingested, inhaled or absorbed through the skin in small quantities.

**h) Noxious chemicals**

Chemicals that can cause death or acute or chronic damage to health if ingested, inhaled or absorbed through the skin.

**i) Corrosive chemicals**

Chemicals which can damage or destroy living tissue on contact.

**j) Chemical irritants**

These chemicals are non-corrosive; however, they can cause skin or mucous membrane irritation even after short, prolonged or repeated contact.

**k) Chemicals causing sensitization**

Chemicals which can cause sensitization when inhaled or absorbed through the skin, resulting in typical negative effects associated with the substance during continued exposure.

**l) Carcinogenic chemicals**

Chemicals that can cause cancer or increase its likelihood if ingested, inhaled or absorbed through the skin.

**m) Mutagenic chemicals**

Chemicals that can cause hereditary genetic defects or increase their likelihood if ingested, inhaled or absorbed through the skin.

**n) Reproductive toxicant chemicals**

Chemicals that can cause or increase the likelihood of non-heritable adverse effects on progeny and/or impair the reproductive capabilities or functions of men and women if ingested, inhaled or absorbed through the skin.

**o) Environmentally hazardous chemicals**

When coming into contact with the environment, these chemicals can or might cause immediate or long-term damage to a part or parts of the environment.

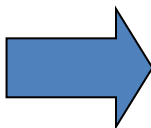
### 3.5.2 LABELLING OF HAZARDOUS CHEMICALS

The GHS regulation (see 3.5.1) establishes a Globally Harmonised System of Classification and Labelling of Chemicals, abbreviated as "GHS"). Starting with 1 June 2015, all chemicals and mixtures must be labelled in accordance with the GHS regulation. Naturally, we still store and use some chemicals which have the old symbols.



Old symbol

**GHS  
REGULATION**



GHS pictogram

The standard warnings (R-phrases) have been replaced with hazard statements (H-statements), while the safety phrases (S-phrases) have been replaced with precautionary statements (P-statements).

#### 3.5.2.1 HAZARD PICTOGRAMS (PICTOGRAMS)



These are black characters on a white background and with a red border. There are nine hazard pictograms which are no longer unambiguous, instead appearing with different descriptions, definitions and explications.

They are divided into:





- a) physical hazard pictograms,
- b) health hazard pictograms,
- c) environmental hazard pictograms.




**PHYSICAL HAZARDS**

Pictogram	Hazard class and category
 <p>GHS 01</p>	<p>Unstable explosives Explosive divisions 1.1, 1.2, 1.3, 1.4 Self-reactive substances and mixtures, types A, B Organic peroxides, types A, B</p>
 <p>GHS 02</p>	<p>Flammable gases, category 1 Flammable aerosols, categories 1, 2 Flammable liquids, categories 1, 2, 3 Flammable solids, categories 1, 2 Self-reactive substances and mixtures, types B, C, D, E, F Pyrophoric liquids and solids, category 1 Self-heating substances and mixtures, categories 1, 2 Substances and mixtures, which in contact with water, emit flammable gases, categories 1, 2, 3 Organic peroxides, types B, C, D, E, F</p>
 <p>GHS 03</p>	<p>Oxidizing gases, category 1 Oxidizing liquids, categories 1, 2, 3 Oxidizing solids, categories 1, 2, 3</p>
 <p>GHS 04</p>	<p>Compressed gases Liquefied gases</p>
 <p>GHS 05</p>	<p>Corrosive to metals, category 1</p>

**HEALTH HAZARDS**

Pictogram	Hazard class and category
 GHS 06	Acute toxicity (oral, dermal, inhalation), categories 1, 2, 3
 GHS 05	Skin corrosion, categories 1A, 1B, 1C Serious eye damage, category 1
 GHS 07	Acute toxicity (oral, dermal, inhalation), category 4 Skin irritation, category 2 Eye irritation, category 2 Skin sensitization, category 1 Specific target organ toxicity following single exposure, category 3 Respiratory tract irritation Narcotic effects
 GHS 08	Respiratory sensitization, category 1 Germ cell mutagenicity, categories 1A, 1B, 2 Carcinogenicity, categories 1A, 1B, 2 Reproductive toxicity, categories 1A, 1B, 2 Specific target organ toxicity following single exposure, categories 1, 2 Specific target organ toxicity following repeated exposure, categories 1, 2 Aspiration hazard, category 1

**ENVIRONMENTAL HAZARDS**

 GHS 09	Hazard to the aquatic environment – Acute hazard, category 1 – Chronic hazard, categories 1, 2
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The “hazard category” designates the type of physical hazard or an environmental/health hazard. Within an individual hazard class, chemicals are further classified into "hazard categories", which are then further divided according to criteria within each hazard class determining the seriousness of the hazard. The number 1 designates the highest level of danger. E.g. in the case of reproductive toxicity:

Category 1A: Substances known to have reproductive toxicity in human being.

Category 1B: Substances reputed to have reproductive toxicity in human beings.

Category 2: Substances suspected of having reproductive toxicity in human beings.

### 3.5.2.2 HAZARD STATEMENTS AND PRECAUTIONARY STATEMENTS

**Hazard statements** (H-statements) will replace standard warnings (R-phrases). A hazard statement applies to a text referencing a hazard class or category, which describes the type of danger posed by a dangerous substance or mixture (as well as the hazard level, if need be). Hazard statements are marked using the letter H and a three-digit code.

**Precautionary statements** (P-statements) will replace standard safety phrases (S-phrases). A precautionary statement is a text describing the recommended measure (or measures) for reducing or preventing negative effects, which are the result of being exposed to a hazardous substance or mixture (preparation) in the course of its use or removal. Precautionary statements are marked using the letter P and a three-digit code. Precautionary statements determine:

- general measures (e.g. P103: Read label before use.);
- prevention measures (P235: Keep cool.);
- response (in case of contact, spill, fire);
- storage (P420: Store away from other materials.);
- disposal (P501: Dispose of contents/container...).

A list of all the hazard and precautionary statements can be found in Appendix No. 2.

How do we know a chemical we are about to use is dangerous or not? All the information can be read on the packaging labels and the safety data sheet.

#### **Which information is found on labels according to the new GHS labelling?**

- 1. Supplier's name, address and telephone number.**
- 2. Product identifier (name and brand name, chemical identity, CAS number, etc.)**
- 3. Pictogram**
- 4. Signal word (Danger or Warning)**
- 5. Hazard statements (H-statements).**
- 6. Precautionary statements (P-statements).**
- 7. Quantity (general use).**
- 8. Supplemental information (other hazard phrases, etc.).**

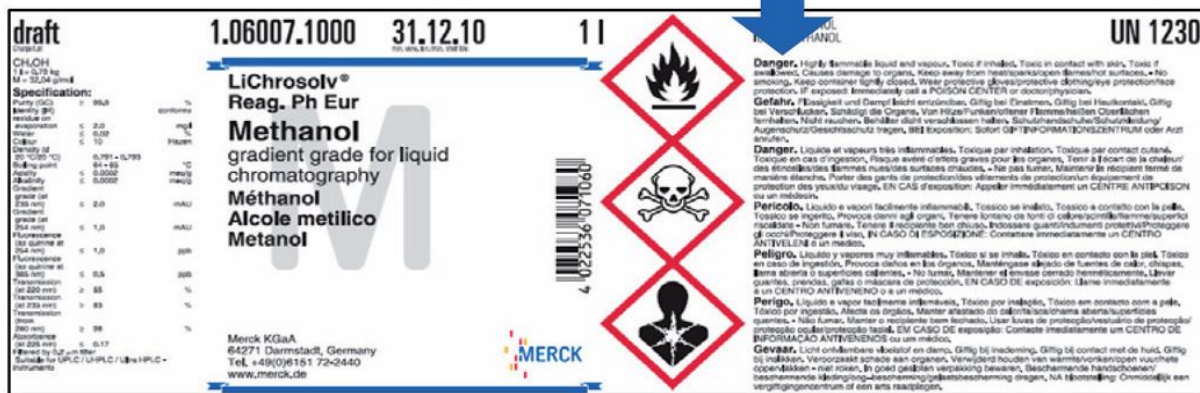
The signal word is used to refer to the relative hazard level, which draws the reader's attention to potential danger. There are two levels:

- "Danger" is a signal word used for more serious hazards;
- "Warning" is a signal word used for less serious hazards.

Below is an example of a label for methanol produced by Merck Germany – according to old and new labelling.



Signal word ("Danger")



Hazard pictograms

Hazard and precautionary statements

Image 15: Example of old package labelling system (above) and the new GHS labelling system (below).

### 3.5.3 SAFETY DATA SHEETS

The majority of the data on the characteristics of hazardous substances can be found on safety data sheets. The person or company manufacturing or marketing the hazardous substance is required to deliver this sheet to the user, so as to guarantee health and environmental safety, as well as occupational health and safety. The safety data sheet is regulated by the EUROPEAN COMMISSION REGULATION (EU). The safety data sheet is obligatory for substances and mixtures classified as hazardous.

The safety data sheet includes the following 16 sections:

1. Identification of the substance/mixture and of the company/undertaking
2. Hazards identification
3. Composition/information on ingredients
4. First aid measures

5. Firefighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure controls/personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations
14. Transport information
15. Regulatory information
16. Other information

### **3.6 WASTE**



Waste containing hazardous substances is called hazardous waste. Hazardous waste must not be disposed of in the trash or poured down drains.

At the UL FKKT, we have a unified labelling system for canisters containing chemical waste. The chemical waste containers have labels with the following information:

1. Type of chemical waste,
2. Signal word,
3. Department,
4. Date on which the waste chemical was stored,
5. Signature of the person who handed over the chemical waste into storage.

Spilled or scattered chemicals are removed in accordance with instructions given by the UL FKKT staff.

An example of a waste chemical label is presented in Image 16.

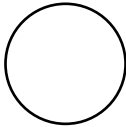

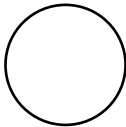

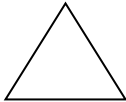

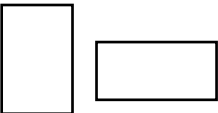

<b>NEVARNI ODPADEK</b>	
<b>ODPADNA NEHALOGENIRANA TOPILA</b>	
	KLASIFIKAC. ŠT.. _____
	KATEDRA: _____
	DATUM: _____
	PODPIS: _____

*Image 16: Example of a waste chemical label*

### 3.7 SAFETY SIGNS

The purpose of safety signs is to quickly and unambiguously warn about objects or substances, which can pose a danger. Safety signs can:

- prohibit (red),
- prescribe (blue),
- save (green),
- warn (yellow).

Colour	Meaning	Use	Geometric shape	Example
<b>Red/white</b>	Explicit order	Stop signs, prohibition signs		
<b>Blue/white</b>	Obligation	Mandatory use of personal protective equipment		
<b>Yellow/black</b>	Warning, danger	Hazard identification (fire, explosions, obstacles)		
<b>Green/white</b>	Information and Instructions	Evacuation route signs, first aid signs		

*Table 1: General meaning of safety sign colours and geometric shapes*

The shape, colour and size of the safety signs, as well as the obligations of employers associated with using safety signs, are regulated by the [Rules on Safety Signs at Work](#) (Official Gazette of the RS, No. 89/1999).

## 4. FIRE PROTECTION

Fire protection is an essential element in guaranteeing safety. All students at the UL FKKT are required to learn in detail about the dangers of fires and explosions that might occur in the course of their work. They must know how to prevent fires and what to do in the event of one. Fire protection is the duty of each and everyone at the Faculty: employees, students, and visitors.

Combustion can be defined as a chemical reaction involving a flammable substance (either solid, liquid or gaseous) and an oxidizing agent – usually oxygen from the air. Fire can be a controlled process used, for example, for generating heat (when starting a fire in a furnace). However, when the fire escapes the boundaries of the fireplace, it is no longer controlled. It can then turn into a blaze or a conflagration. The flammable material must be heated to ignition temperature. For example, wood ignites at around 250 °C, similarly to paper.

How and why do fires even start?

A fire will occur only when the following is present in large enough quantities or concentrations:

- Flammable material (fuel),
- Oxidizing agent (oxygen, air or an oxidant),
- Source of heat or ignition.

Fuel, oxygen and heat are three elements that are absolutely essential for combustion; together, they make up the **fire triangle**, also known as the combustion triangle.








*Image 15: Fire triangle [https://en.wikipedia.org/wiki/Fire\\_triangle](https://en.wikipedia.org/wiki/Fire_triangle)*

During combustion, a flammable substance can either be solid, liquid and/or gaseous. Fuel can be solid (A), liquid (B) or gaseous (C). A special class of fuels are also non-ferrous metals (d) and edible oils and fats (F).



Table 2: Classes of combustible substances

Type of fire	Flammable substance	Pictogram
<b>A</b>	<b>SOLIDS</b> <ul style="list-style-type: none"><li>- wood</li><li>- paper</li><li>- textile</li><li>- ....</li></ul>	
<b>B</b>	<b>LIQUIDS</b> <ul style="list-style-type: none"><li>- alcohol</li><li>- ether</li><li>- tar</li><li>- ....</li></ul>	
<b>C</b>	<b>GASES</b> <ul style="list-style-type: none"><li>- acetylene</li><li>- methane</li><li>- hydrogen</li><li>- ....</li></ul>	
<b>D</b>	<b>NON-FERROUS METALS</b> <ul style="list-style-type: none"><li>- magnesium</li><li>- aluminium</li><li>- lithium</li></ul>	
<b>F</b>	<b>FATS</b> <ul style="list-style-type: none"><li>- edible oils and fats</li></ul>	

The requirements pertaining to fire protection measures are regulated by the [Fire Protection Act \(OCT – 1: Official Gazette of the RS, No. 3/07\)](#), which stipulates under Article 9 that:

"Pursuant to the Act, any natural and legal person shall have criminal and damage liability for failing to implement the fire protection measures and for the consequences arising thereof."

In Article 45, the same law also states:

"Any person discovering imminent fire or explosion hazard or noticing a fire shall dispose of the hazard and/or extinguish the fire so far as he or she can do so without endangering himself/herself or others. If unable to do so, such a person shall have the obligation to report it without delay to the nearest fire-fighting unit, notification centre or police station. In doing so, he or she shall be assisted by any person having a means of communication or transport at his or her disposal."

The fire protection organization at the UL FKKT, which includes preventive measures and measures in case of a fire, will be outlined below.



## **4.1 UL FKKT FIRE PREVENTION PLAN**

The Fire Prevention Plan is an internal UL FKKT document, which sets out the methods and measures for guaranteeing fire safety at the UL FKKT.

The most important provisions of the Fire Prevention Plan are summarized in the [Fire Prevention Plan Fire Prevention Plan Excerpt](#), provided as Appendix 3. The excerpt is displayed on every floor of the buildings at Večna pot 113.

The Restriction of the Use of Tobacco Products Act (Official Gazette of the RS, No. 60/2007) and the UL FKKT Fire Prevention Plan prohibit the following:

- Smoking on the Faculty premises;
- Using an open flame, with the exception of laboratory Bunsen burners, which are always used responsibly and in accordance with fire safety measures;
- Using an elevator in the event of a fire.

The duties of students, visitors, and clients, as set out by the Fire Safety Order:

- Students, visitors, and clients (business partners) must follow all the provisions of the Fire Prevention Plan, the common safety measures, as well as the fire contingency plan and instructions in case of a fire (Fire Prevention Plan Fire Prevention Plan Excerpt) that are visibly displayed around the Faculty.
- Students, other visitors, and clients (business partners) may only linger on Faculty premises during working hours and with the knowledge of the staff;
- Students, visitors, and clients (business partners) are required to report any irregularities or fire hazards to faculty staff. All open flames, as well as bringing and disposing of flammable materials in non-designated spaces, are strictly forbidden on Faculty premises.
- In the event of a fire, students, visitors, and clients (business partners) are required to follow staff instructions and vacate the building – going to the evacuation meeting point behind the buildings – as quickly as possible.

In addition to the Fire Prevention Plan Fire Prevention Plan Excerpt, each floor also has an evacuation plan (Image no. 17) – the floor plan with indicated fire extinguishers, hydrants, manual fire alarms and the evacuation route. In the event of an emergency, each floor at the UL FKKT also has an evacuation route marked with pictograms.

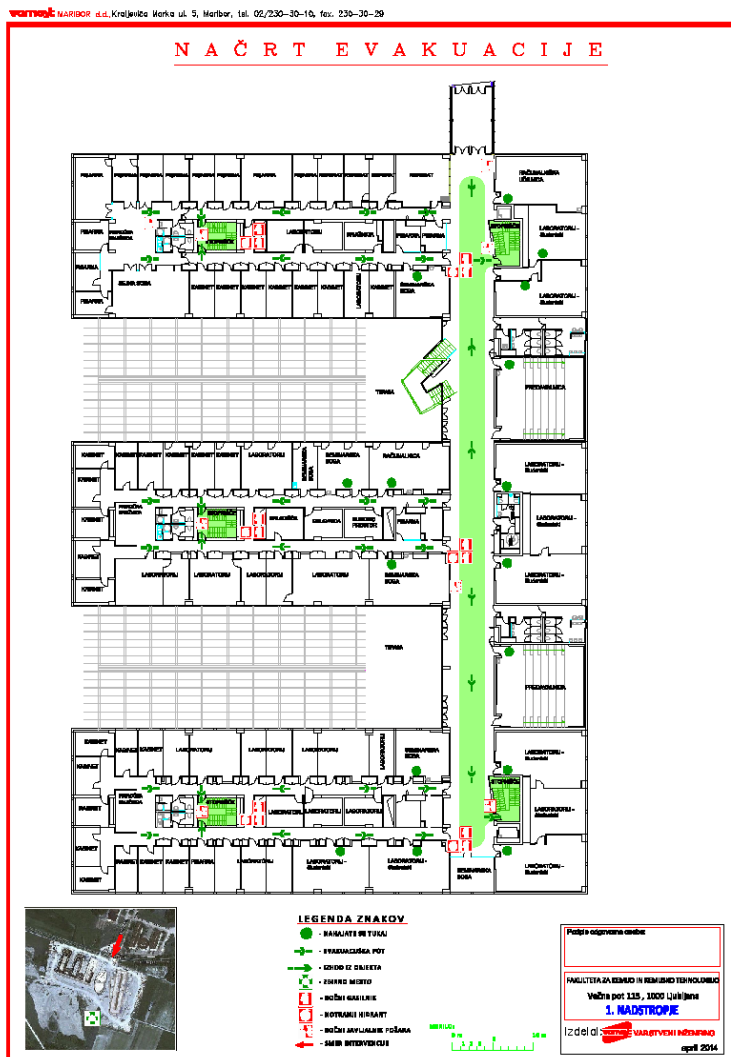


Image 17: Evacuation plan

## 4.2 DETECTION DEVICES, FIRE ALARMS, AND ALARM SYSTEMS

### 4.2.1. FIRE ALARM

The most important elements of any fire alarm system are the fire alarms, which can be classified according to their mode of operation, the media detecting it, as well as the coverage and power sources. Based on the mode of operation, we use manual and automatic fire alarms.

Automatic fire alarms (hereinafter: AFA), as shown on Image 18, are installed on the Faculty ceilings. In the event of smoke or a rise in temperature in particular space, the AFA sends out a signal to the fire command centre, which then sound the siren.



*Image 18: Automatic fire alarm (right) and alarm indicator (left)*

Manual fire alarms (hereinafter: MFA), pictured in Image 19, are installed along the evacuation exits and passageways. By pressing the button, we immediately sound the fire alarm. Manual fire alarms are intended for sounding a fire alarm even before the fire hazard is detected by the AFA.



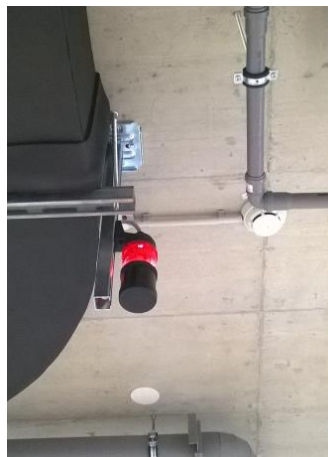
*Image 19: Manual fire alarms*

#### **4.2.2. GAS DETECTION**

Laboratories are equipped with detectors, which measure gas concentrations (Image 20). In the event of higher concentrations of gasses or a lower concentration of oxygen, a visible and audible signal turns on in the laboratory (Image 21).



*Image 20: Gas Detector*



*Image 21: Light and audio signal used when detecting gas*

### **4.2.3. ALARM SYSTEM**

The main aim of sounding the alarm is to warn people in the building about a fire or a high concentration of gas.

During a fire, the alarm sounded using the fire siren and previously recorded voice message. In the event of elevated gas concentrations or reduced oxygen levels, visual and audio signals (Image 21) will only turn on in the laboratory, where the hazardous concentration of gas had been detected.

If the fire siren has been activated, we are required to evacuate the building and go to the meeting point – following instruction provided by the Faculty staff.

## **4.3. FIRE FIGHTING MATERIALS AND EQUIPMENT**

The buildings, located at Večna pot 113, are equipped with two systems:

- the sprinkler system,
- manual devices and equipment for extinguishing small fires.

### **4.3.1. SPRINKLER SYSTEM**

A sprinkler system is a built-in system with its own water distribution piping system, where pressurized water is found on one side and the sprinkler nozzles (Image 22) on the other side. The sprinkler nozzle is held closed by a cap, which is kept in the orifice of the nozzle by a red glass bulb (reservoir), which breaks at 68°C. When the bulb breaks, water starts flowing from the sprinkler nozzle.



*Image 22: Sprinkler nozzle*

### **4.3.2. HANDHELD FIRE SUPPRESSION DEVICES AND EQUIPMENT FOR SMALL FIRES**

When faced with small fires, we can count on the following devices and equipment:

- Fire extinguisher,
- Fire hydrant system,
- Fire blankets.

Small fires can most easily be extinguished using a fire extinguisher. Manual fire extinguishers are located in special cabinets marked with a pictogram (Image 23). A hydrant is installed in the upper cabinet, while the lower cabinet contains two manual fire extinguishers: on the left, we find a dry-chemical extinguisher, while a CO<sub>2</sub> fire extinguisher is located on the right.



*Image 23: A cabinet containing a hydrant and the two fire extinguishers.*

Fire blankets (Image 24) are wall mounted on every floor along the main corridor. A fire blanket can be used to cover a burning surface or be wrapped around a person whose clothes are on fire.



*Image 24: Fire blanket*

It is well established that a fire can spread from its point of ignition to neighbouring fuels, developing into a full-fledged fire. When it first starts – immediately after ignition – the fire is smaller and easier to put out. This applies to the combustion of most flammable solids and flammable liquids with a higher flashpoint. According to some theories, small incipient fires can be classified as those having a surface area of 1 m<sup>2</sup>. When extinguishing fires with devices for initial extinguishing, the user will have more success if they are trained to handle such incipient fires. We should never try and extinguish fires using devices for initial extinguishing if:

- we do not know the type of flammable substance;
- the fire is progressing rapidly;
- we do not possess adequate fire fighting equipment;
- the space is full of smoke and hot;
- "something is telling us" we should move away as quickly as possible ...

Whenever we notice a fire, we must stay calm. If saving people in danger is involved, we first help everyone in need and then prepare the extinguisher and start putting out the fire. We inform faculty staff of the situation and follow their instructions.



**4.3.2.1 FIRE EXTINGUISHERS**

The fire extinguisher is a device used for initial extinguishing. A pressure vessel, which is either under constant pressure or not, is filled with an extinguishing agent that is emptied because of internal pressure. It is made up of a vessel containing an extinguishing agent, an activating valve and a nozzle used for creating a jet; it usually also has a hose used to direct the extinguishing agent toward the fire. Depending on the extinguishing agent, fire extinguishers can be filled with:

- water and water additives,
- dry chemicals,
- foam,
- gaseous extinguishing agents and
- wet chemicals.

The UL FKKT has both dry powder fire extinguishers and CO<sub>2</sub> fire extinguishers. Below, you can learn which extinguishing agent is best suited for a particular type of fuel.

*Symbols found on fire extinguishers & what they mean*

					
	Water	Foam Spray	ABC powder	Carbon dioxide	Wet chemical
Wood, paper & textiles 	✓	✓	✓	✗	✓
Flammable liquids 	✗	✓	✓	✓	✗
Flammable gases 	✗	✗	✓	✗	✗
Electrical contact 	✗	✗	✓	✓	✗
Cooking oils & fats 	✗	✗	✗	✗	✓

I

Image 25: Selecting a fire extinguisher based on the type of flammable substance  
<http://fmsuk.net/Extinguisher%20Matrix.html>



### **Dry Powder Fire Extinguishers**

Dry powder fire extinguishers are used for extinguishing A, B, C, D and F type fires. At the UL FKKT, each cabinet has a manual fire extinguisher with a 6 kg capacity. These are used for extinguishing class A, B, and C fires (Image 26).



*Image 26: Dry powder fire extinguisher*



*Image 27: CO<sub>2</sub> fire extinguisher*

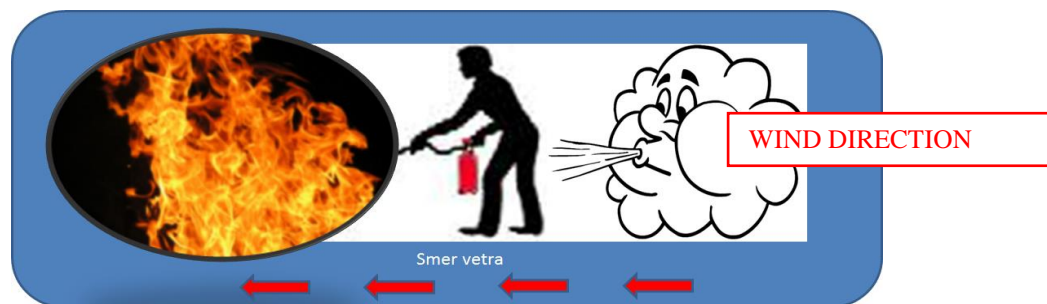
### **CO<sub>2</sub> Fire Extinguishers**

The most frequently used fire extinguisher is the manual CO<sub>2</sub> fire extinguisher. The marking CO<sub>2</sub>-3, CO<sub>2</sub>-5, CO<sub>2</sub>-30 provides information on the number of kilograms of the substance in the device. The CO<sub>2</sub> fire extinguisher is intended for extinguishing B and C class fires, as well as high-voltage devices (flammable liquids and gases, high- and low-voltage electrical apparatuses, electrical installations, electronic devices, telephones, radio and TV devices and computers). In the extinguisher, the CO<sub>2</sub> is kept compressed. The jet can reach 3 m and a 5 kg fire extinguisher works for 15 s. Portable CO<sub>2</sub> extinguishers can be filled with 3 and 5 kg, while those transported (on smaller trailers) can be filled with 10, 30, and 60 kg.

The cabinets at the UL FKKT contain manual CO<sub>2</sub>-5 fire extinguishers that are intended for incipient class B fires (Image 27).

#### **4.3.2.2 USING A FIRE EXTINGUISHER**

If we believe we are able to extinguish the fire on our own, we first select the appropriate fire extinguisher in approach the fire in the direction of the wind. It is recommended to always prepare at least two extinguishers, since one of the devices could easily fail. When outdoors, we always put out fires from an upwind position.



*Image 27: Extinguishing a fire upwind*

We first activate the fire extinguisher (by pulling out the safety pin and pressing the operating level) and then direct the nozzle holder toward the fire. When using a dry powder fire extinguisher or gaseous extinguishing agents, we will achieve the best results by directing the nozzle holder towards the flame, moving it in a zigzag motion (left and right, up and down) over the flame (chemical powders extinguish fires using chemical inhibitions– a chemical intervention with disrupts the oxidation chain reaction). Once the flame slightly decreases in size, we should direct the nozzle holder in the direction of the flammable substance.



Image 28: Using a fire extinguisher [http://emergency.emory.edu/just\\_in\\_time/fire.html](http://emergency.emory.edu/just_in_time/fire.html)



## 4.4 EVACUATION

Once the flammable solids, liquids and gases undergo combustion, the incipient fire may grow into a developed fire. If the incipient fire, which started in closed spaces, is not extinguished – and provided there is enough flammable materials around – the number of substances caught in the fire rapidly begins to rise, which also increases the quantity of emitted heat and the temperature in the room. The air temperature or the temperature of the smoke under the ceiling can rise to around 600 °C, which means this hot layer of gas starts emitting strong thermal radiation. In a very short period of time, all the remaining materials, not yet consumed by the fire, may ignite. The flames consume the entire space and the fire becomes a fully developed fire. The incipient phase of the fire is characterized by mounds of smoke or flames. The smoke emanating from a fire with a long incipient phase can very quickly spread beyond the confines of where it first started. The building is divided into fire sectors according to floors and spaces, each having different fire resistance – 30, 60 and 90 minutes. The automatic fire alarm detects the smoke from the fire; the higher temperatures (68 °C) on the other hand, are detected by the sprinkler nozzles. A fire siren goes off in both events and the building then needs to be evacuated. The sounds of the fire siren are accompanied by a recorded spoken message in Slovene, English, and German. In case of fire, all people present in the building (except those providing first aid and helping with the extinguishing efforts) must leave the facility and head to the meeting point.

We can only do that, if we are familiar with the locations, spatial configurations and exits. The floor plans for the buildings are included in the evacuation plans. The evacuation route is marked with green signs – pictograms –, as shown in Image no. 29.



*Image 29: Pictograms – evacuation route signs*

The evacuation is carried out according to instructions provided by faculty staff; we must make our way to the meeting point and await further instructions. The meeting point, marked with a sign, is located on the south side of the platform behind building X (Image no. 30).



*Image 30: Evacuation meeting point*

**Never use elevators during an evacuation!**

The handicapped and the physically disabled, who are unable to take the evacuation route leading down the staircase, must travel from Floor 1 and enter Building X; If stranded on the 2nd and 3rd floors, they should wait for the rescue personnel on the balcony (Image no. 31).



*Image 31: The two balconies used to evacuate physically disabled people*

1. Before carrying out the evacuation, make sure to go over the evacuation plan; find your way within the building and get acquainted with the evacuation routes.
2. Talk with the staff if you have questions regarding the evacuation plan and the evacuation itself. Make sure to familiarize yourself with evacuation procedures.
3. Make sure to participate in evacuation drills!

#### **How and evacuation should take place:**

1. Follow the instructions provided by the staff!
2. You should exit the building in an orderly fashion (pushing and shoving will only delay the evacuation)!
3. During the evacuation, you should always do your best to help people who find it harder to evacuate the building.
4. The evacuation should follow the evacuation routes.
5. Never use an elevator during evacuation.
6. When you exit the building, go to the assigned meeting point (make sure you know where your meeting point is ahead of time).
7. Do not re-enter the building, until allowed to do so.

#### **4.5. ADDITIONAL INFORMATION**

1. UNION OF FIREFIGHTERS OF SLOVENIA, Tržaška cesta 221, 1000 Ljubljana  
[www.gasilec.net](http://www.gasilec.net)
2. SLOVENIAN FIRE PROTECTION ASSOCIATION, Dunajska cesta 369, 1231 Ljubljana-Črnuče  
[www.szpv.si](http://www.szpv.si)
3. ADMINISTRATION FOR CIVIL PROTECTION AND DISASTER RELIEF, Vojkova cesta 61, 1000 Ljubljana  
[www.sos112.si](http://www.sos112.si)

## **5. RISK ASSESSMENT AND MEASURES FOR ENSURING HEALTH AND SAFETY AT WORK FOR PREGNANT AND BREASTFEEDING STUDENTS**

Pursuant to the [Rules on the Protection of Health of Pregnant Workers, Workers Who have Recently Given Birth, and Breastfeeding Workers at Work](#), the Faculty is required to provide a risk assessment and establish the type, level and duration of exposure for all types of work involving exposure to factors, which could negatively affect the health of pregnant workers and workers recently having given birth or who are still breastfeeding. It must assess the type and level of risk for injuries and health impairments, as well as determine and implement suitable measures. Because of the wide variety of work undertaken by women, especially when working in a laboratory setting, it is impossible to predict the workplaces in which pregnant workers or workers who have recently given birth and are still breastfeeding cannot perform their duties. It is likewise impossible to determine safety measures for individual work places so far in advance. These kinds of measures can only be truly determined for an individual, taking into account the locations, where she works, what agents she is exposed to, as well as in what quantities and for how long.

### **RISK ASSESSMENT PROCEDURE FOR STUDENTS**

The student should report her pregnancy to the staff at the Student Office as soon as possible. The staff will then inform the vice-dean for undergraduate studies, who performs the risk assessment procedure. The student must then fill in the [Izjava za nosečnice - Š](#) form (Statement of Pregnant Students), published on the UL FKKT website. An occupational medicine physician and the vice-dean responsible for safety also take part in preparing the risk assessment. Should circumstances warrant it, the risk assessment procedure may also include all other stakeholders (gynaecologist, teachers, the pregnant woman, an expert in the field of HSW and FP).

The original filled in form is kept at the Student Office, while photocopies are given to the pregnant woman in question, the signatories to the risk assessment, and to the relevant teachers.

The measures, set out in the assessment, come into force when the document is signed by all interested parties. If during the pregnancy, the education process should change in such a way as to be able to have an affect on the pregnant woman's health, the risk assessment process must be repeated.

## 6. BIBLIOGRAPHY

1. [Health and Safety at Work Act](#) (Official Gazette of the RS, No. 43/2011).
2. [Chemicals Act](#) (Official Gazette of the RS, No. 110/03).
3. [Fire Protection Act](#) (Official Gazette of the RS, No. 3/07).
4. [Rules on the Classification, Packaging, and Labelling of Dangerous Preparations](#) (Official Gazette of the RS, No. 35/05, 54/07, 88/08 and 6/14).
5. [Rules on the Classification, Packaging and Labelling of Dangerous Preparations promet](#) (Official Gazette of the RS, št. št. 67/051, 137/06, 88/08, 81/09 and 6/14).
6. [Rules on Safety Signs at Work](#) (Official Gazette of the RS No. 89/99, 39/05 and 38/15)
7. [Rules on the Protection of Health of Pregnant Workers, Workers who have Recently Given Birth and Breastfeeding Workers at Work](#) (Official Gazette of the RS, no. 62/15).
8. Prudent Practice in the Laboratorij, National Reasearch Council, USA, 1995.
9. Priročnik za strokovni izpit iz varstva pri delu, ZVD, Ljubljana 1988.
10. Priročnik za pripravo na strokovni izpit iz varstva pri delu, Upravna akademija, Ljubljana 2006.
11. Priročnik za pripravo na izpit za svetovalca za kemikalije, ZVD, Ljubljana 2006.
12. Fundamentals of Laboratory Safety - Physical Hazards in the Academic Laboratory, William J. Mahn, New York, 1991.
13. Laboratory Safety CRC Handbook, 4<sup>th</sup> Ed., 1995.
14. [Laborrichtlinien: „Sicheres Arbeiten in Laboratorien – Grundlagen und Handlungshilfen“](#), Izdaja: marec 2015 Graduate Student Safety Guide, *Joint Committe for Health, Safety and Environment*, The John Hopkins University, Baltimore USA.
15. SIST EN 166 »Osebo varovanje oči - Specifikacija«.
16. DIN 12899, 1. del »Laboratorijska oprema; Oprema za tuše v sili; Tuši za telo, Varnostno-tehnične zahteve, preizkusi«.
17. Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on Classification, Labelling, and Packaging of Substances and Mixtures.
18. UNION OF FIREFIGHTERS OF SLOVENIA, Tržaška cesta 221, 1000 Ljubljana  
[www.gasilec.net](http://www.gasilec.net)
19. SLOVENIAN FIRE PROTECTION ASSOCIATION, Dunajska cesta 369, 1231 Ljubljana-Črnuče, [www.szpv.si](http://www.szpv.si)
20. ADMINISTRATION FOR CIVIL PROTECTION AND DISASTER RELIEF, Vojkova cesta 61, 1000 Ljubljana, [www.sos112.si](http://www.sos112.si)

## 7. APPENDICIES

1. Laboratory safety rules of UL FKKT.
2. List of P-statements and H-statements.
3. Fire Prevention Plan Excerpt

*Appendix 1: Laboratory safety rules of UL FKKT*

Pursuant to Health and Safety at Work Act (Official Gazette No. 56/99 and 64/01) and Art. 77 of the Statute of the Senate of the University of Ljubljana, and Art. 69 of the Rules on organisation and operation of FKKT, and by the decision of the 36th Senate meeting of Feb 22, 2013, FKKT has adopted Annex No 2 to the Rules on safety at work with risk assessment:

## LABORATORY SAFETY RULES OF UL FKKT

### 1. Scope

- 1.1. Laboratory safety rules shall apply to laboratories of FKKT, UL.
- 1.2. Every person entering the laboratory: employees, students, and other visitors (hereinafter: users) must comply with the laboratory safety rules.
- 1.3. In addition to Laboratory safety rules the users need to comply with the provisions of Health and Safety Statement with risk assessment, Instructions for safe work during student exercises, Fire Order, Materials Safety Data Sheets and other guidelines and oral instructions.

### 2. Definitions

The concepts used in these Rules shall have the following meaning:

- 2.1. **Hazardous laboratory operations** are procedures and operations which may lead to risks for injuries or cause health damage. These include:
  - Working with hazardous or unknown chemicals,
  - Risks due to exposure to biological factors,
  - Working at increased or decreased pressure and/or temperature conditions,
  - Working with electrical equipment under voltage above 1 kV,
  - Working with ionising radiation sources,
  - Using moving equipment which involves risks,
  - Working on heights.
- 2.2. **Hazardous chemicals** are substances or preparations having at least one of hazardous properties: explosive, oxidising, flammable, self-reactive, self-heating, pyrophoric, corrosive, toxic, harmful to health, irritating, carcinogenic, mutagenic, toxic for reproduction, dangerous for the environment, or gases under pressure, or materials and mixtures which produce flammable gases in contact with water.
- 2.3. **Head of the laboratory** is a university teacher or assistant appointed by the Head of the Chair of FKKT, a regular employee with responsibilities for ensuring health and safety at work and fire safety, as provided by indent 3.3. of the Safety Statement.  
<http://www.fkkt.uni-lj.si/attachments/1150/izjava-o-varnosti-z-oceno-tveganja.pdf>.

- 2.4. **Laboratory manager** is a person appointed by the head of the laboratory, and is a regular employee of FKKT (university teacher, assistant, or senior professional) with responsibilities for ensuring health and safety at work and fire safety as provided by indent 3.4. of the Safety Statement <http://www.fkkt.uni-lj.si/attachments/1150/izjava-o-varnosti-z-oceno-tveganja.pdf>
- 2.5. **Threshold value** is a mean concentration of a hazardous substance in the air at the workplace which is being inhaled. It is generally not hazardous to workers if inhaled at lower values than threshold limits with exposure up to eight hours a day (40 days a week), full working hours at normal microclimate conditions provided that physically undemanding jobs are performed.
- 2.6. **Hazardous waste** is a type of waste containing hazardous substances, classified into one of the groups of hazardous wastes.
- 2.7. **Incident** is an event which results in an injury, disease, fire and/or explosion, release of chemicals, damage on equipment, material damage, or represents a risk for the environment.

### 3. General provisions

- 3.1. Laboratory safety rules must be displayed in a visible place in every laboratory.
- 3.2. All activities in the laboratory must be carried out in such a way as to avoid any risk for personal injuries or work-related diseases, and material damage. Operations which involve risks should be carried out under surveillance of persons who know the risks and can take protective measures.
- 3.3. Operating time in the laboratories is Monday to Friday from 7.00 a.m. to 8.00 p.m. and Saturdays from 8.00 a.m. to 12.00.
- 3.4. Working in the laboratory outside the operating time is allowed only upon written permission of the Head of the Chair. Working alone in the laboratory is not allowed. Special permission can be given only to regular employees or contractors of UL FKKT. For those performing work on instruments in infrastructural centre or centre of excellence, permission can be given under the conditions set out in the agreement between FKKT and the centre.
- 3.5. In case hazardous operations are performed in the laboratory there should always be two persons present.
- 3.6. Faulty apparatus (holders, containers, burners, supplies, measuring instruments, etc.) and faulty electrical appliances must not be used. All defects should be immediately reported orally or in writing to the laboratory manager.
- 3.7. Drinking, eating and smoking in the laboratories is strictly forbidden. It is also forbidden to keep food in laboratory refrigerators.





- 3.8. Access to exits, fire stairs, fire extinguishers and electrical switches must not be obstructed.
- 3.9. For cleaning laboratories, the provisions of the Annexes to Laboratory safety rules with risk assessment No 29 and 30 should be applied («Instructions for safe work in cleaning laboratories») <http://www.fkkt.uni-lj.si/si/?704>.
- 3.10. For every laboratory a risk assessment has been made according to the checklist for laboratories <http://www.fkkt.uni-lj.si/attachments/1122/2-kontrolnik-za-laboratorij.pdf>. The duty of the head of the laboratory is to inform persons working in the laboratory on risk assessment and to update it in cooperation with the office for safety if the conditions in the laboratory have changed and if any new risks have emerged.
- 3.11. If pregnant women, or breastfeeding mothers use the laboratory, a risk assessment needs to be made on a special form which is part of the annex to Safety statement with risk assessment.
- 3.12. Using mobile phones or other multimedia devices in a laboratory is forbidden except in emergency cases.



#### **4. Personal Protective Equipment**



- 4.1. All users of the laboratory must be informed about the types and use of personal protective equipment and how to access it.
- 4.2. Depending on the type of work and operations the users must wear personal protective equipment as described in manufacturers' instructions, material safety data sheets, guidelines for work, generally accepted rules, standards and regulations of R Slovenia.
- 4.3. All persons in the laboratory must wear a laboratory coat and safety glasses with suitable side shields at all times.
- 4.4. Wearing mules and sandals in the laboratory is forbidden. Long hair must be tied back.

#### **5. Handling with chemicals**

- 5.1. The head of the Chair or research group is responsible for keeping a file with materials safety data sheets for all commercially available hazardous substances used in the laboratory.
- 5.2. Before using hazardous substances the user must be informed about their potential risks and preventive measures. University teachers (course managers), or project leaders must assess risks for the whole working procedure prior to the commencement of laboratory work and based on materials data safety sheets take suitable protective

measures and inform the researchers and laboratory technicians on these measures. The measures must be prepared in a written format and the head of the chair or project leader must be notified.

- 5.3. Chemicals, stored in the laboratory must be suitably arranged in an order. Quantities should be kept to the minimum. Every laboratory must keep records on stock and the laboratory manager is responsible for updating the list of chemicals. Maximum allowed quantity per chemical is 2.5 L (exceptions may be approved by the head of the laboratory).
- 5.4. In storing chemical the guidelines for joint storing of hazardous chemicals according to the following table should be considered:  
[http://www.uk.gov.si/fileadmin/uk.gov.si/pageuploads/pdf/Pravilnik\\_skladiscenje\\_-\\_priloga\\_II.pdf](http://www.uk.gov.si/fileadmin/uk.gov.si/pageuploads/pdf/Pravilnik_skladiscenje_-_priloga_II.pdf). Quantities of chemicals stored in a laboratory should not exceed the capacities of cabinets for storage.
- 5.5. Containers with hazardous chemicals need to be labelled with safety signs. Samples kept in smaller containers need to be labelled so as to allow identification of the user. If such samples are meant to be stored for a longer period of time, they need to be kept in larger containers and properly labelled.
- 5.6. It is forbidden to store chemicals in containers used for food.
- 5.7. Extremely toxic, carcinogenic or mutagenic substances and materials, as well as substances toxic for reproduction, must be kept locked and supplied to the user only in quantities necessary for carrying out the experiment and upon Written order for supplying chemicals. The person, responsible for the storage of such chemicals, must not be the user of these chemicals.
- 5.8. Operations in which hazardous substances evolve gases, vapours, steam, aerosols or dust, should be performed in a fume hood. The laboratory manager must ensure that concentrations of carcinogens or mutagens in the air do not exceed threshold values and needs to provide the procedure for such work.
- 5.9. In transporting and decanting chemicals it is necessary to take proper measures to prevent spills. Spilt hazardous liquids must be immediately absorbed with an absorbing agent and disposed of as hazardous waste (see indent 9.5.).
- 5.10. It is necessary to use suitable devices for pipetting. Mouth pipetting is strictly forbidden.
- 5.11. It is the responsibility of the laboratory manager to determine which chemicals and the conditions under which they are allowed to be stored in a laboratory.
- 5.12. It is forbidden to purchase or take deliveries of chemicals which are have not been commercially packed.
- 5.13. It is forbidden to purchase or use explosive and radioactive substances.



## **6. Handling with gas cylinders**

- 6.1. Make sure that during transportation and storage cylinder valve caps are securely in place. Transportation of cylinders is allowed only with special hand trucks.
- 6.2. At all times (during transportation, storage or use) the cylinders must be secured from tipping over and protected against heating above 50° C (sun heat, burners, furnaces, radiators, etc.).
- 6.3. Only equipment which is suitable for the gas in the cylinder, or the pressure and temperature in it should be used.
- 6.4. If the valve on the cylinder cannot be opened by hand, the cylinder needs to be marked and removed from use, and the manufacturer should be notified.
- 6.5. A gas cylinder which has not been used (attached to the instrument) for more than a month, needs to be removed from the laboratory to the cylinder storage room, while cylinders with flammable, toxic and oxidising gases need to be removed from the laboratory after every use.
- 6.6. The user should follow the recommendations of the manufacturer for each particular gas used.

## **7. Wastes**

- 7.1. Different types of wastes must be collected separately in disposed of in containers.
- 7.2. Only chemicals and wastes which do not contain hazardous material can be disposed into sewage or waste containers.
- 7.3. Wastes must be treated according to the Annex No. 31 Safety statement with risk assessment: Treatment of hazardous waste <http://www.fkkt.uni-lj.si/attachments/1145/31-ravnanje-z-nevarnimi-odpadki.pdf>.
- 7.4. Disposing of wastes on passages, evacuation balconies or roof terraces is forbidden.
- 7.5. Wastes must be disposed of on a daily basis.

## **8. Hygiene**

- 8.1. After finishing a job in a laboratory it is necessary to wash hands thoroughly. Other parts of body which have been exposed to hazardous substances should be cleaned as necessary.

- 8.2. Laboratory coats which have been used in a laboratory should not be worn in libraries, lecture and seminar rooms, cafeteria, or outside faculty premises.



## 9. Emergency situations

- 9.1. In case of an incidence the head of the laboratory, or one of the authorised persons from the list displayed next to the Laboratory safety rules, needs to be immediately notified about the event.
- 9.2. Injured persons should be immediately given first aid. First aid cabinets contain the list of authorised persons with telephone numbers for giving first aid. Locations of first aid cabinets are given in the evacuation plan.
- 9.3. In case of a serious event call **112**, i.e. Notification Centre (fire brigades, first aid).
- 9.4. In case of emissions of toxic or flammable gases or vapours or in cases of large spills, all people in the laboratory must be evacuated. Only rescuing teams wearing protective equipment may enter such laboratory.
- 9.5. In case of spillage of chemicals users should apply the Guidelines for emergency situations in case of spills: [http://www.fkkt.uni-lj.si/attachments/2887/navodilo\\_za\\_ravnanje\\_v\\_primeru\\_razlitja\\_kemikalij.pdf](http://www.fkkt.uni-lj.si/attachments/2887/navodilo_za_ravnanje_v_primeru_razlitja_kemikalij.pdf) and take measures provided for in materials safety data sheets.
- 9.6. Initial fire must be suppressed with the fire fighting equipment available and all persons should be evacuated.
- 9.7. In case of failing to suppress fire the janitor of the building should be notified immediately, or emergency number should be called (Notification Centre). Detailed instructions on procedures in case of fire are given in the Summary of Fire Order.
- 9.8. Location of fire fighting equipment is presented in the evacuation plan.

This Annex enters into force after the approval of the Faculty Senate and shall be published on notice boards of FKKT.

Prof. Dr. Anton Meden,  
The Dean of UL FKKT

*Appendix 2: List of P-statements and H-statements*

**List of GHS Precautionary Statements and P Codes**

- P101: If medical advice is needed, have product container or label at hand.  
P102: Keep out of reach of children.  
P103: Read label before use.  
P201: Obtain special instructions before use.  
P202: Do not handle until all safety precautions have been read and understood.  
P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.  
P211: Do not spray on an open flame or other ignition source.  
P220: Keep/Store away from clothing/.../combustible materials.  
P221: Take any precaution to avoid mixing with combustibles...  
P222: Do not allow contact with air.  
P223: Keep away from any possible contact with water, because of violent reaction and possible flash fire.  
P230: Keep wetted with...  
P231: Handle under inert gas.  
P232: Protect from moisture.  
P233: Keep container tightly closed.  
P234: Keep only in original container.  
P235: Keep cool.  
P240: Ground/bond container and receiving equipment.  
P241: Use explosion-proof electrical/ventilating/lighting/.../equipment.  
P242: Use only non-sparking tools.  
P243: Take precautionary measures against static discharge.  
P244: Keep reduction valves free from grease and oil.  
P250: Do not subject to grinding/shock/.../friction.  
P251: Pressurized container: Do not pierce or burn, even after use.  
P260: Do not breathe dust/fume/gas/mist/vapours/spray.  
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.  
P262: Do not get in eyes, on skin, or on clothing.  
P263: Avoid contact during pregnancy/while nursing.  
P264: Wash ..... thoroughly after handling.  
P270: Do not eat, drink or smoke when using this product.  
P271: Use only outdoors or in a well-ventilated area.  
P272: Contaminated work clothing should not be allowed out of the workplace.  
P273: Avoid release to the environment.  
P280: Wear protective gloves/protective clothing/eye protection/face protection.  
P281: Use personal protective equipment as required.  
P282: Wear cold insulating gloves/face shield/eye protection.  
P283: Wear fire/flame resistant/retardant clothing.  
P284: Wear respiratory protection.  
P285: In case of inadequate ventilation wear respiratory protection.  
P231 + P232: Handle under inert gas. Protect from moisture.  
P235 + P410: Keep cool. Protect from sunlight.  
P301: IF SWALLOWED:  
P302: IF ON SKIN:

- P303: IF ON SKIN (or hair):
- P304: IF INHALED:
- P305: IF IN EYES:
- P306: IF ON CLOTHING:
- P307: IF exposed:
- P308: IF exposed or concerned:
- P309: IF exposed or if you feel unwell:
- P310: Immediately call a POISON CENTER or doctor/physician.
- P311: Call a POISON CENTER or doctor/physician.
- P312: Call a POISON CENTER or doctor/physician if you feel unwell.
- P313: Get medical advice/attention.
- P314: Get medical advice/attention if you feel unwell.
- P315: Get immediate medical advice/attention.
- P320: Specific treatment is urgent (see ... on this label).
- P321: Specific treatment (see ... on this label).
- P322: Specific measures (see ... on this label).
- P330: Rinse mouth.
- P331: Do NOT induce vomiting.
- P332: If skin irritation occurs:
- P333: If skin irritation or rash occurs:
- P334: Immerse in cool water/wrap in wet bandages.
- P335: Brush off loose particles from skin.
- P336: Thaw frosted parts with lukewarm water. Do not rub affected area.
- P337: If eye irritation persists:
- P338: Remove contact lenses, if present and easy to do. Continue rinsing.
- P340: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P341: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P342: If experiencing respiratory symptoms:
- P350: Gently wash with plenty of soap and water.
- P351: Rinse cautiously with water for several minutes.
- P352: Wash with plenty of soap and water.
- P353: Rinse skin with water/shower.
- P360: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes.
- P361: Remove/Take off immediately all contaminated clothing.
- P362: Take off contaminated clothing and wash before reuse.
- P363: Wash contaminated clothing before reuse.
- P370: In case of fire:
- P371: In case of major fire and large quantities:
- P372: Explosion risk in case of fire.
- P373: DO NOT fight fire when fire reaches explosives.
- P374: Fight fire with normal precautions from a reasonable distance.
- P375: Fight fire remotely due to the risk of explosion.
- P376: Stop leak if safe to do so.
- P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
- P378: Use ... for extinction.
- P380: Evacuate area.
- P381: Eliminate all ignition sources if safe to do so.
- P390: Absorb spillage to prevent material damage.

- P391: Collect spillage.
- P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- P301 + P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
- P301 + P330 + P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
- P302 + P334: IF ON SKIN: Immerse in cool water/wrap in wet bandages.
- P302 + P350: IF ON SKIN: Gently wash with plenty of soap and water.
- P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
- P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P304 + P341: IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P306 + P360: IF ON CLOTHING: rinse immediately contaminated clothing and skin with plenty of water before removing clothes.
- P307 + P311: IF exposed: Call a POISON CENTER or doctor/physician.
- P308 + P313: IF exposed or concerned: Get medical advice/attention.
- P309 + P311: IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
- P332 + P313: If skin irritation occurs: Get medical advice/attention.
- P333 + P313: If skin irritation or rash occurs: Get medical advice/attention.
- P335 + P334: Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.
- P337 + P313: If eye irritation persists: Get medical advice/attention.
- P342 + P311: If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
- P370 + P376: In case of fire: Stop leak if safe to do so.
- P370 + P378: In case of fire: Use ... for extinction.
- P370 + P380: In case of fire: Evacuate area.
- P370 + P380 + P375: In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.
- P371 + P380 + P375: In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.
- P401: Store ...
- P402: Store in a dry place.
- P403: Store in a well-ventilated place.
- P404: Store in a closed container.
- P405: Store locked up.
- P406: Store in corrosive resistant/... container with a resistant inner liner.
- P407: Maintain air gap between stacks/pallets.
- P410: Protect from sunlight.
- P411: Store at temperatures not exceeding ... oC/...oF.
- P412: Do not expose to temperatures exceeding 50 oC/122oF.
- P413: Store bulk masses greater than ... kg/... lbs at temperatures not exceeding ... oC/...oF.
- P420: Store away from other materials.
- P422: Store contents under...
- P402 + P404: Store in a dry place. Store in a closed container.
- P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
- P403 + P235: Store in a well-ventilated place. Keep cool.
- P410 + P403: Protect from sunlight. Store in a well-ventilated place.
- P410 + P412: Protect from sunlight. Do no expose to temperatures exceeding 50 celcius degress.

P411 + P235: Store at temperatures not exceeding ...Keep cool.

P501: Dispose of contents/container to...

## **List of GHS Hazard Statements and H Codes**

H200: Unstable explosive

H201: Explosive; mass explosion hazard

H202: Explosive; severe projection hazard

H203: Explosive; fire, blast or projection hazard

H204: Fire or projection hazard

H205: May mass explode in fire

H206: Fire, blast or projection hazard; increased risk of explosion if desensitizing agent is reduced

H207: Fire or projection hazard; increased risk of explosion if desensitizing agent is reduced

H208: Fire hazard; increased risk of explosion if desensitizing agent is reduced

H220: Extremely flammable gas

H221: Flammable gas

H222: Extremely flammable aerosol

H223: Flammable aerosol

H224: Extremely flammable liquid and vapour

H225: Highly flammable liquid and vapour

H226: Flammable liquid and vapour

H227: Combustible liquid

H228: Flammable solid

H229: Pressurized container: may burst if heated

H230: May react explosively even in the absence of air

H231: May react explosively even in the absence of air at elevated pressure and/or temperature

H232: May ignite spontaneously if exposed to air

H240: Heating may cause an explosion

H241: Heating may cause a fire or explosion

H242: Heating may cause a fire

H250: Catches fire spontaneously if exposed to air

H251: Self-heating; may catch fire

H252: Self-heating in large quantities; may catch fire

H260: In contact with water releases flammable gases which may ignite spontaneously

H261: In contact with water releases flammable gas

H270: May cause or intensify fire; oxidizer

H271: May cause fire or explosion; strong oxidizer

H272: May intensify fire; oxidizer

H280: Contains gas under pressure; may explode if heated

H281: Contains refrigerated gas; may cause cryogenic burns or injury

H290: May be corrosive to metals

H300: Fatal if swallowed

H301: Toxic if swallowed

H302: Harmful if swallowed

H303: May be harmful if swallowed

H304: May be fatal if swallowed and enters airways

H305: May be harmful if swallowed and enters airways

H310: Fatal in contact with skin

H311: Toxic in contact with skin

H312: Harmful in contact with skin  
H313: May be harmful in contact with skin  
H314: Causes severe skin burns and eye damage  
H315: Causes skin irritation  
H316: Causes mild skin irritation  
H317: May cause an allergic skin reaction  
H318: Causes serious eye damage  
H319: Causes serious eye irritation  
H320: Causes eye irritation  
H330: Fatal if inhaled  
H331: Toxic if inhaled  
H332: Harmful if inhaled  
H333: May be harmful if inhaled  
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled  
H335: May cause respiratory irritation  
H336: May cause drowsiness or dizziness  
H340: May cause genetic defects  
H341: Suspected of causing genetic defects  
H350: May cause cancer  
H351: Suspected of causing cancer  
H360: May damage fertility or the unborn child  
H361: Suspected of damaging fertility or the unborn child  
H361d: Suspected of damaging the unborn child  
H362: May cause harm to breast-fed children  
H370: Causes damage to organs  
H371: May cause damage to organs  
H372: Causes damage to organs through prolonged or repeated exposure  
H373: May cause damage to organs through prolonged or repeated exposure  
H400: Very toxic to aquatic life  
H401: Toxic to aquatic life  
H402: Harmful to aquatic life  
H410: Very toxic to aquatic life with long-lasting effects  
H411: Toxic to aquatic life with long-lasting effects  
H412: Harmful to aquatic life with long-lasting effects  
H413: May cause long-lasting harmful effects to aquatic life  
H420: Harms public health and the environment by destroying ozone in the upper atmosphere



Appendix 3: Fire Prevention Plan Excerpt

## IZVLEČEK POŽARNEGA REDA

V skladu s pravilnikom o požarnem redu (Ur. l. RS, št. 52/07, 34/11, 101/11)

Veljavnost: FAKULTETA ZA KEMIJO IN KEMIJSKO TEHNOLOGIJO, Večna pot 113, 1000 Ljubljana

### I. ORGANIZACIJA VARSTVA PRED POŽAROM

Sistem varstva pred požarom ureja ZAKON O VARSTVU PRED POŽAROM (Ur. l. RS 03/07, 09/11). Vsaka oseba, ki dela ali se nahaja v prostorih obravnavanega objekta je dolžna skrbeti za varstvo pred požarom. Vsaka oseba je v skladu z zakonom kazensko in odškodninsko odgovorna za neizvajanje ukrepov varstva pred požarom.

Glede na velikost in namembnost prostorov je predvideno število uporabnikov objekta do 2.535.

### II. UKREPI VARSTVA PRED POŽAROM

Vsaka nepravilnost oziroma nevarnost za nastanek požara je potrebno takoj sporočiti zaposlenim, le ti pa po presoji odgovorni osebi za varstvo pred požarom.

Gasilniki in ostala sredstva namenjena požarni varnosti, morajo biti vedno na svojih mestih ter redno vzdrževana in pregledovana, dostop do njih pa vedno prost. Po končanem delu preverite, če so odstranjeni vsi možni viri za nastanek požara, izklopljena vsa glavna elektro stikala in drugi energetski dovodi.



Prepovedana je uporaba ognja in kajenje.



Z nevarnimi snovmi odprtega ravnanja po navodilih proizvajalca.



Vzdržujte red in čistočo. Vse nevarne in gorljive odpadke je potrebno dnevno odstranjevati.



Pred pričetkom vzdrževalnih in drugih del, ki lahko predstavljajo nevarnost za nastanek požara je potrebno zagotoviti požarno stražo. Zagotovite neoviran dostop do gasilnih sredstev in naprav za izklop električnega toka ter proste poti za evakuacijo.

### III. UKREPI V PRIMERU POŽARA



#### OSTANITE MIRNI IN PRISEBNI!

Ocenite velikost požara. Če je požar v začetni fazi in ga lahko pogasite brez nevarnosti zase ali druge ljudi, uporabite razpoložljiva gasilna sredstva (gasilniki, notranji hidranti).

Če nastalega požara sami ne morete pogasiti:



Sprožite ročni javljalik požara in pokličite:

**CENTER ZA OBVEŠČANJE 112 (POLICIJA 113)**

in javite: - kdo kliče,  
- kje (kaj) gori,  
- ali so ljudje v nevarnosti in bo potrebno reševanje,  
- obseg požara in ali je možnost širitve na sosednje objekte.

Opozorite ogrožene osebe in poskrbite za evakuacijo nemočnih.

V objektu zaprite dovode električne energije (izklop glavnih stikal) in drugih energetskih virov.



**ZAPRITE GLAVNI PLINSKI POŽARNI VENTIL**

Objekt zapustite po evakuacijskih poteh, pri tem upoštevajte navodila odgovornih. Evakuacijske poti zavarujte pred zadimljenjem in se zberite na varnem (evakuacijskem) mestu izven objekta.



Uporaba dvigala je v primeru požara **PREPOVEDANA!**

Podpis odgovorne osebe:

Ljubljana, junij 2014