

Institut des sciences et ingénierie
chimiques (ISIC)

Section de chimie et de génie chimique
(SCGC)



*Rules of Hygiene,
Safety
and Environmental
Protection*

November 2004

Disclaimer:

This freestyle English Translation of the Safety Manual is being provided for the benefit of collaborators who are not fluent in French. The official- French - version should be consulted for any ambiguity or clarifications.

Security units

Faculty : Service of security and health at workplace

ISIC : Commission of security :

Head : Director of ISIC

Laboratories

The Director is the first responsible of security

He is technically helped by the safety delegate.

1. GENERAL SAFETY CONCEPT

1.1 Objectives

- Committed to protect the coworker's health, to limit the risk of accident at a low as possible level and to contribute to the environmental respect, the Institut des sciences et ingénierie chimiques (ISIC) and the Section de chimie et de génie chimique (SCGC) jointly apply the hereafter rules of safety, hygiene and environmental protection.

1.2 Coworkers and buildings attached to ISIC and SCGC

- Entire scientific and technical personnel, students and apprentices are held to respect the security instructions appearing in the regulations and its appendices

- The Director of unit can add provisions in appendices concerning internal measurements relative to specific dangers met in their laboratories. These directives should not be in contradiction with the common regulations and have to be announced to the Direction of ISIC.

- When a work is carried out with an organization external to ISIC/SCGC or in rooms which are not attached to it, the collaborator must take note of the local safety requirements before beginning his work and to conform thereon

2. RESPONSABILITIES

2.1 Responsibility of the employers

- In Switzerland, there exist two legislations which deal with the safety and health at work. The Law for accident insurance (LAA) and the work-Law (LTr). Apart from accident insurance, the LAA regulates the prevention of accidents and illnesses. The LTr deals with health at the working place and the

The LTr says that

« In order to protect the health of the worker, the employer has to bear all measures which in the past have been shown to be necessary that the level of the technique allows to apply and are adapted to the facilities of the company. »

« The employer requests a collaboration from the workers on the health protection. They have to help the employer to implement them. »

The obligation Law (CO) stipulates (art. 328, al. 2) that the employer has to warn the employees about the cautions and preventions to take and to respect. However, he is not obliged to advise the coworkers about obvious risks.

2.2 Responsibilities of coworkers

- Besides the employer obligations and legal responsibilities, the coworker can also be responsible for the occurrence of an accident.

- The LAA states that « the coworkers have to assist the employer in the implementation of rules and regulations for the prevention of accidents and work-related illnesses. In particular, they must use the individual protective equipment and use properly the safety equipments and refrain to lift or modify them.

- The OPA (art. 11) indicates :

« the coworker has to follow the directives of the employer concerning safety at work and observe the generally admitted security rules. In particular, he must use the individual protection equipment and make sure that these are used in an efficient way.

When a coworker detects faults that compromise safety at work, they must immediately eliminated them. If he is not able or authorised of doing so, he should inform the employer without delay.

The coworker must not bring himself in a position were his own safety or that of others is in danger. In particular, the consumption of alcohol or other mind benders.

2.3 To know before starting to work

Each collaborator must be able to answer the following questions:

- Where is the fire exit of the laboratory?
- Where are the safety ways and stairways of evacuation?
- How to reach help and whom to call?
- How to start a fire alarm?
- Where are the emergency locks for natural gas and electricity?
- Where are the extinguishing equipments (extinguishers, safety blankets, sand buckets)?
- What to do in case of liquid spill?
- Where are the ocular scanner head or the rinse-eye and the safety shower?
- Where is the nearest pharmacy?
- Which are the laboratories with special detectors and how to be alarmed?
- Where are emergency phone numbers?
- Which fumehoods are equipped with a fire detection?
- Where is a bunker for high pressure reaction?
- What to do if I foresee an unattended reaction?
- How to find safety information on chemicals?

3. SECURITY AT WORKPLACE

3.1 New coworker

- Each new coworker including visiting people, student, apprentice must receive detail instruction on the safety rules and on the specific dangers linked with their own work, the safety areas "zone Ex" (if present) and the procedures.
- Before to be allowed to start to work, he must also know how to behave in case of emergency, evacuation, fire, spill etc.

Building	CH	BCH
Distribution fluids	<ul style="list-style-type: none">- compressed air- gazous nitrogen- naturel gas- warm & cold water- cooling water at 7°C- industrial water- Vapor	<ul style="list-style-type: none">- compressed air- gazous nitrogen- naturel gas- warm & cold water- cooling water at 10°C- desionised water
How to close the fluid entrance ?	<ul style="list-style-type: none">- learn the dedicated place.	<ul style="list-style-type: none">- close the ??? under the bench or under the fume hood.- the sector entrance can be closed in the technical cupboard, close to the meeting area.
In case of malfunction	<ul style="list-style-type: none">- PCC, phone 115	<ul style="list-style-type: none">- technician, phone 97 2480
In case of danger	<ul style="list-style-type: none">- PCC, phone 115 (day & night)	
In case of immediate danger	<ul style="list-style-type: none">- push the fire button which transmits the alarm to the firemen	

- The Director is responsible for the organization of the instruction and gives the authorisation to start to work.

3.1.1 Access to the laboratory

- Only authorised people by the Director allows to work in the laboratory.
- Students and apprentices are not allowed to enter within laboratory in absence of their advisor and to work in evening and weekend. Exception: advanced students with the agreement of the professor.
- This is forbidden to work alone at the laboratory. This is not relevant for office work performed in a dedicated area of the laboratory.
- This is forbidden to block a fire door in an open position.

3.1.2 Work at the laboratory

- The Director is responsible to regularly verify the respect of safety à workplace. The coworker is held to follow the rules.
- The workplace must be kept clean and non ?encombrée?.
- The window of the fume hood is must be kept closed as soon as the need of access to it is over.
- When somebody is leaving the laboratory, he (her) checks the laboratory.

3.1.3 Clothes and safety equipment

- Safety goggles and a labcoat have to be worn in the lab with the exception of the office-space and are distributed for free. Wearing a labcoat is forbidden in the cafeteria, in seminar rooms, lecture halls etc
- The feet have to be entirely protected up to the ankles. Sandals and other kinds of open shoes are not allowed
- Protection gloves have to be worn if required according to the material safety data sheets of the product. There is no universal glove ! each material has its pros and cons. Appendix 1 provides further information concerning the characteristics of the various types of gloves.
- Gloves should also be worn to protect oneself against burns from heat or cryo-fluids and against injuries when working with sharp objects .
- In every preparative chemistry lab at least one face shield should be available. In addition, safety shields should also be available.

3.1.4 Acquisition and storage of chemicals

- There is forbidden to buy a chemical or a biological compound without to pass through the central order system. Acquisition of psychotropes or radioactive substances is allowed only after legal authorization to request to the Direction of ISIC. Acquisition of compounds listed as chemical weapons following the rules of "Convention sur les armes chimiques » and the « 'ordonnance sur le contrôle des produits chimiques" is forbidden.
- Each product must be identified in the electronic database. Exception: products from syntheses in small quantities (< 0.5 g) can be identified in a global manner..
- Once a year at least, an inventory must verify the stock under the Director supervision.
 - ° compounds older than 5 years are eliminated. The Director is allowed to save some of them (specially the collection of the Laboratory). Then I must send yearly this list certify by his (her) signature to the Director of ISIC.
 - ° The containers with a damaged label have to be discarded.
- Chemical-containing-cupboards must be ventilated and have at least a safety tray on the lower shelf.
- Chemical-containing-cupboards must have a safety sticker indicating the categories of risks:



T

toxic compound



C

corrosive material



Xi

irritating compound



Xn

nocive compound



E

explosive material



F

flammable material



O

comburant

- The following categories of substances are stocked separately: flammable, oxydizing, acid, base. Acetic acid is placed with flammable due to its low flash point (40°C).
- toxics are always placed in a ventilated cupboard.
- Fridges must be kept without smelling atmosphere and must be clean as soon as occurring rusty spots on iron elements. The Laboratory is not allowed to buy directly a new fridge but must requests it to the chemical shop.
- Freezers must be defrosted as soon as ice icy layer is occurring.
- Gas cylinders must be bring to the chemical shop before the limit date given by the supplier.

3.1.5 Transportation of chemicals

- Bottles containing chemicals are placed in bucket or in cart for transportation.
- The content must never be larger than the capacity of the container.
- This is forbidden to take a substance outside of the workplace without an authorization from the Director or the safety delegate. The transportation must follow the rules of the « Ordonnance sur le transport des matières dangereuses ». This is forbidden to leave chemical at home.

3.1.6 Use of compounds

- Only needed chemicals for the current work can stay at the workplace.
- If the individual and collective protective equipment seems to be insufficient to complete your work, you must immediately inform the Director.
- Each coworker must have access to the material safety data sheets of his (her) own commercial products and must know how to read it. The Director is responsible to protect his personnel, the public and the environment against the eventual effects of the compounds used within the Laboratory.
- It is forbidden to use simultaneously a workplace for storage and for an experiment. (Exemple : a fume hood can not be a storage place and a place for synthesis).
- Only the needed quantity of solvents for the current work can be found at the workplace but never more than 15 litres in bottles smaller than 3 litres. The capacity of the flask is used.
- the use of carbon tetrachloride is forbidden. The use of benzene requires an authorization if no other solvent can replace it.
- No more than 100 litres can be stored by laboratory (including wastes) in ventilated safety cabinet.
- This is forbidden to store alcalii metals and their alloys. A small reserve is available at the chemical shop.
- Hydrides, silanes, phosphorus, phosphines, nickel Raney, platinum on carbon and other spontaneously flammable compounds are stocked in suitable flasks (ex. Dessociator) and, if necessary under inert atmosphere or appropriate liquid.

3.1.7 Forbidden unattended experiments

- It is forbidden to leave unattended an experiment if :
 - ° use of toxic gas, like CO, phosgene, phsophines, chlorine
 - ° very exothermic reaction as diazotation, Grignard, hydrogenation, nitration, etc.
 - ° manipulation of alcalii metals.
 - ° prepare a reaction fin autoclave.
 - ° manipulation of flammable solvents in opened system.

3.1.8 Authorized unattended experiments

- An unattended reaction have to be accompanied by a safety form describing the manipulation (appendix 2)
- Then the reaction has an heating system, we use generally an oil bath. The temperature must be follow with a double safety system a) a probe linked with the apparatus, b) an independent probe which cuts power in case of troubles. The heating mantels are forbidden.
- At the BCH, unattended experiments are placed in fume hoods equipped with an fire detection

3.1.9 Gas cylinders

- Gas cylinders must be ensure against fall with a safety belt attached on a surface fixed on the ground (i.e. wall, cupboard, fume hood, bench). Tables are not fixed fouritures.
- Il est interdit de constituer des réserves de Laboratoire.
- Use of toxic or flammable gas can only be performed if there is a detection with an alarm system as long as the cylinder stays in the laboratory.

3.2 Work under fume hood - toxicity of standard substances

- All chemical reactions must be performed under a hood, even when considered harmless.

The following procedures must be performed under a fume hood or within a closed space (glove box) directly connected to the aspiration system of the ventilation or with the help of a vapor evacuation system connected to the ventilation:

- Work with emissions of dust, vapors, gases, fog and smoke.
- Work with gases.
- Work with substances having a Threshold limit value (TLV) lower than 100 ppm (see Annex 3). If a compound is not listed, it must be considered unknown and therefore potentially dangerous.
- Work more than 50 g or 50 ml of a substance whit a flash point lower than 30 C (see Annex 3). Flash point: lowest temperature at which a sample emits enough vapor to form a mixture with surrounding air able to ignite in the presence of a flame.

The coworker who suggests a reaction is responsible for the destruction and elimination of all dangerous substances used or produced. When in doubt, he must ask the Director.

In BCH, it is forbidden to perform any work with a risk of emission in a hood that does not carry a "ready for heavy gases" label (*équipé pour gaz lourds*).

3.3 Biological, radioactive, psychotropic material

Specific legislation applies to work with biological, radioactive and psychotropic material. Any person who did not receive the ISIC Direction's agreement is strictly forbidden to stock or use such material and must be considered a part of the general public.

4. WASTE DISPOSAL AND TREATMENT

4.1 Chemicals

- Dilution of chemicals for elimination is forbidden.
- Collection receptacles must be properly labeled and their size must match the waste production. All wastes must be eliminated after 90 days at the latest.
- When possible, pure chemicals should be returned to the store room. This makes their treatment and recycling easier.
- Liquids and solids must be collected separately.
- Unknown compounds must be returned to the store room as well.
- Unused cylinders must be returned to the store room, specifying whether they are empty or full.

4.1.1 Recovery of particular substances

- The substances enumerated below must be recovered in an independent way :
 - **cyanides** and substances being able to release cyanides by chemical reaction.
 - **metal mercury**, object soiled with metallic mercury, thermometers, apparatuses containing mercury, lamps to mercury, etc., **mercury oxides and salts**.
 - **benzene** and non-halogenated solutions containing more than 2% benzene.
 - **iodine-** containing-compounds.
 - **silica gel**.
 - solids must never be mixed before elimination.

4.1.2 Solvent recovery

- Containers are specifically dedicated for:
 - **organic solvents** (conc.< 1% of halogenated substance, without benzene).
 - **halogenated solvents** (conc. > 1% of halogenated substance, without benzene nor iodine).
- **Aqueous solutions** are poured to the sink except if:
 - containing **heavy metals, cyanides** or very **toxic** compounds.
 - the ratio of **organic substances** (other than ethanol, natural sugars) exceeds a concentration of 5% or if the quantity of slightly polluted water exceeds 5 liters.
 - Then these values are exceeded or in case of any doubt, the solutions are considered as special waste.

4.2 Non contaminated conventional materials

- Each collaborator must contribute to the effort of recovery of conventional waste and should follow the directives of the EPFL to the CH and of the UNIL to the BCH and the CP.
- The trashes emptied by the central services should not contain substances or objects which could lead to a risk of health or injury to the cleaning and transport staff.
- In no case **liquid waste** can be placed in the trash.
- **Cutting or edging objects** must be conditioned as to avoid the risk of wound for the persons who must leave them.
- **Used glass** is eliminated as special waste except if it is contaminated and if a sticker distributed by the chemical shop covers the original one
- **The needles of syringes** are recovered in rigid containers only dedicated for this use. The container can be eliminated in a conventional way if the needles cannot arise, even partially, during the operations of handling of the personnel of cleaning.

5. EMERGENCIES

FOR ANY CASE OF EMERGENCY CALL 115

5.1 Fire

5.1.1 Fire detection

- The principle of fire detection and alarm system is described in the table below.

	CH	BCH
Detection	- Each room is equipped with one or more detectors	
Type de detection	- Smoke detector..	- Smoke detector. - As soon as a detector is activated, the red lamp at the entry of the room turns on.
Manual alarm	- Press the emergency button to alert the firemen of the school and those of Lausanne.	- to press the emergency button located near sanitary block of every sector

- Fume hoods are not equipped with fire detector except those described in appendix 5. In the case of fire, **alarm will not be transmitted** as long as the fume is circulating in the fume-hood!

- In the case of activities which release dust or fume being likely to initiate a false alarm, the detection of the room or the zone can be inhibited for a strictly limited duration if the user contacts:

	CH	BCH
Work releasing dust	- PCC, phone 115	- Exploitation technique UNIL phone 97 24 80

5.1.2 Extinguishing means

- Extinguishing means available for the users are listed in appendix 6.

- the personnel has to check alarm and extinguishing means, to know their locations in order to act quickly in case of intervention.

- Protection masks must not be used for personal protection in the case of fire!

5.1.3 Used or defective extinguishing means

- Any people who observing any used or defective extinguishing means (unsealed, empty extinguisher, etc.) has to warn:

	CH	BCH
Used extinguisher	- PCC, phone 4000	- Bring the extinguisher to the chemical shop with a label with the N° of the laboratory.
Defected material	- PCC, phone 4000	- Exploitation technique, phone 97 24 80
Periodic control	- janitor	- Exploitation technique

5.1.4 Behavior in case of alarm

- In case of alarm,

- 1) GET INFORMED about the place and the nature of alarm.
- 2) PROTECT yourself and others (e.g.: to move away from the flammable or explosive substances).
- 3) REMOVE THE VICTIMS from an imminent danger.
DO NOT MOVE THEM IF THEY ARE ALREADY IN A SAFE PLACE.
- 4) ALERT: 115, if there are victims.
- 5) USE THE EXTINGUISHING MEANS (appendix 6). A fast reaction contribute to limit the damage and to localize the beginning of fire.

- ACT ONLY WITHOUT ENDANGERING YOUR SAFETY NOR THOSE OF OTHERS!

- IF AN EVENT IS NOT OBVIOUSLY CONTROLLABLE ANY MORE BY YOUR OWN MEANS, PRESS THE EMERGENCY BUTTON.

5.1.5 Behavior if alarm comes from your Unit

- If possible, a collaborator is waiting the arrival of the security services or firemen at the following place:

	CH	BCH
Daytime monitoring	- A coworker of the group is waiting in the lobby near the place of alarm and inform the rescuers	
Direct monitoring	- If somebody of the group is present, he or she is waiting outside of the building, close to the activated orange flashing light .	
People should be able to indicate	-the place of alarm -the cause of alarme (extent of danger, burning substances and materials) -whether there are persons in danger -whether there are victims	

5.2 Evacuation

5.2.1 Principle

- The evacuation is DECIDED by the security service or firemen.
- The emergency lighting and the indicators of safety exit are activated.
- Appendix 7 indicates the place of assembling

5.2.2 Behavior in case of evacuation

- Everybody being in the sectors to be evacuated must leave the building while following, if possible, emergency exits.
- It is advisable to take the stairways. The lifts are blocked during alarm.
- **Before leaving your room, check if nobody remains on the place or is not able to move.** Keep informed the rescuers.
- if possible, switch off the dangerous installations, such as distillations, reactions in progress, all the electrical devices. Close the cupboards with solvents or chemicals.

5.2.3 place of assembling

- Any evacuated people must imperatively go to the place of assembling announced with the green panel (see appendix 7):



- The Director of the laboratory has to check the manpower of his group as well as people which can be under his/her responsibility.

-The personnel is awaiting the directives of the security services or firemen.

-Nobody has to leave the place of assembling without to have announced him- or herself to the responsible person who will take note of it.

-Any information concerning the nature of fire, chemical danger or relating to possible victims has to be communicated to the Director who will inform safety services or firemen.

5.3 Accident

FOR ANY CASE OF EMERGENCY CALL 115

- While calling to the rescuers, indicate:

- The place where the victim is.

- The room number where the victim is.

- The phone number where one can contact a person staying near the victim.

- The persons close to the event assist the rescuers.

5.5 Solvent spill

- the emergency kit (mineral absorbent) which allows to collect the solvent spill on the ground can be found in buckets:

	CH	BCH
Where to find it?	- Containers available in the safety cupboards.	
Compatible solvents ?	- suitable for all organic solvents, oils, acids and bases.	
How to use it ?	- Pour a 3 to 5 mm layer of absorbent on the contaminated floor. - Let to absorb for a few minutes. - Collect the used absorbent and to place it in a solvent resistant container	
How to dispose it ?	- The used absorbent becomes a special waste. - Label it with a sticker indicating the content: "mineral absorbent containing approximately X ml of substance Y" .	
Where do dispose it ?	- bring the container to the chemical shop.	
How to restock the absorbent ?	- Prepare an event report for the safety engineer.	
If a liquid pour in the drains ?	- PCC, phone 115.	

PROTECTING GLOVES AGAINST CHEMICALS

You must absolutely know that :

- 1) protection of hands against chemical is a first importance (SUVA recommendation). Studies show that 10% of chemicals are at the origin of allergy reactions and that 30% amongst them induce irritation of the skin.
- 2) No glove is able to protect the skin against every kind of compounds
- 3) The same gloves can't be bear more than 4 hours at a stretch.

For information, the chart presents several classical types of laboratory gloves and their performance against chemicals (from Maagtechnics). There is no guarantee.

Type of glove	ether	HC	H ⁺	OH ⁻	Ar	C=O	ions	use
Latex	0	-	0	+	-	-	+	Short time
Vinyle	0	0	0	+	-	-	+	Short time
Viton	0	++	++	++	+	-	++	Long period
Butyl-caoutchouc	+	-	++	++	0	0	++	Long period
Nitril-caoutchouc	0	0	0	++	-	-	++	Long period
Neoprene	0	0	0	+	-	-	+	Long period
Nat. caoutchouc .	0	-	0	+	-	-	+	Dishes
NBR	0	++	++	++	+	0	++	Long period

++ : excellent; + : good, 0 : limit, - : poor.

Appendix 2

SECURITY FORM FOR UNATTENDED REACTION

(night & weekend)

CHIMIE - SECURITE

Date(s) : _____ Heures : _____
du _____ au _____ de _____ à _____

Resp. : _____ Tél. privé : _____ / _____

Rempl. : _____ Tél. privé : _____ / _____

EXPERIENCE - REACTION :

Solvant

Dangers particuliers :

Un incendie éventuel peut être éteint avec :

de l'eau

du gaz carbonique

du sable



(Biffer ce qui ne convient pas)

Appendix 3

Threshold limit values (TLV) of classical compounds (VME aux postes de travail 1997, N° 1903, SUVA)

Compound	ppm	Compound	ppm	Compound	ppm
Ethyl acetate	400	Acetone	500	Acetic acid	10
Hydrochloric acid	5	Ammoniac	20	Aniline	2
Benzene	1	Brom	0.1	Butanol	50
Thionyle chloride	1	Cresol	5	Cyclohexane	200
Cyclopentane	600	Dichloromethane	100	Dimethoxymethane	1000
Dimethylformamid	10	Dimethylsulfoxyde	50	Dioxane	20
Ethanol	1000	Petrol ether	500	Diethyl ether	400
Ethylenglycol	10	Formaldehyde	0.5	n-Hexane	50
Hexane (other)	200	Methanol	200	Pentane	600
Phenol	5	Propanol	200	Pyridine	5
Tetrachlorocarbon	5	Tetrahydrofuran	50	Toluene	50
1,1,1-trichlorethan	200	1,1,2-trichlorethan	10	Triethylamine	1

Flash point (Fp) of classical solvents (Caractéristiques de liquides et gaz, N° 1469, CNA)

Compound	Fp/°C	Compound	FpC	Compound	FpC
Ethyl acetate	- 4	Aceone	- 20	Acetic acid	40
Butanol	34.5	Cyclohexane	- 17	Dichloromethane	---
Dimethylformamid	58	Dimethylsulfoxyde	95	Dioxane	10
Ethanol	16	Diéthyl ether	- 41	n-Hexane	- 22
Méthanol	6 - 7	Pentane	- 40	Propanol	22.5
Tetrachlorocarbon	---	Tetrahydrofuran	- 17	Triethylamine	20

Threshold limit values (TLV) of gas (VLE aux postes de travail 1997, N° 1903, SUVA)

Compound	ppm	Compound	ppm	Compound	ppm
Acetylene	1000	Hydrobromic acid	2	Hydrochloric acid	5
Cyanhydric acid	10	Hydrofluoric acid	1.8	Ammoniac	20
Bromomethane	5	Butane	800	Cetene	0.5
Chlore	0.5	Chloromethane	50	Cyanogene of chloroform	0.3
Diborane	0.1	Nitrogen dioxyde	3	Chlor Dioxyde	0.1
Ethane	10000	Ethylene	10000	Carbonic acid	5000
Sulfur hydrogen	10	Methane	10000	Methylamine	10
Carbon monoxyde	30	Nitrogen oxyde	25	Ozone	0.1
Phosgene	0.02	Nitrogen protoxyde	100	Boron trifluoride	1

Appendix 4

APPROVED LABORATORIES FOR WORK WITH RADIOACTIVE COMPOUNDS

- Only approved rooms for some specific work with radioactive sources.

Chart 1 : approvals from the OFSP for use of ionising radiation.

Building	Laboratory	Type of approval	Approved sources	Duration
BCH	6120	Laboratoire C	- ^3H , ^{14}C , ^{32}P , ^{35}S - Th natural, - ^{65}Zn , ^{147}Sm (natural)	17 nov. 2009 VD-70.14.1
BCH	2118	Analytical laboratory	- X ray equipments with full protection	30 avr. 2001 VD-70.3.5/6
BCH	4230	Analytical laboratory	- X ray equipments with full protection	31 mars 2002 VD-70.3.8
CP	282, 353, 354, 362, 378	Marked area in the laboratory	- Uranyle acetate (natural) 350 KBq per year	17 nov. 2009 VD-70.14.1
CH	G1-634	Sealed sources	- ^{60}Co 1.92 PBq	31 mai 2001 VD-729.1.1/4
CH	G1-634	Sealed sources	- ^{241}Am 37 GBq	28 fév. 2002

LABORATORIES "Ex" & AUTOMATIC EXTINGUISHING SYSTEM

Rooms "Ex" at the BCH :

Building	Room N°	Type of room"Ex"	Remark
BCH		100%	Chemical shop, without extinguisher
BCH		100%	Chemical shop, without extinguisher
BCH	1206	"Ex" 1 m. high	Automatic extinction with CO ₂
BCH	1208	"Ex" 1 m. high	Automatic extinction with CO ₂
BCH	1237	"Ex" 1 m. high	Automatic extinction with CO ₂
BCH	1238	"Ex" 1 m. high	Automatic extinction with CO ₂
BCH	5432	"Ex" 1 m. high	Automatic extinction with CO ₂
BCH	6239	"Ex" 1 m. high	Automatic extinction with CO ₂

Rooms "Ex" at the CH:

Building	Room N°	Type of room"Ex"	Remark
CH	Puit 1 1 ^{ère}	100 %	

- BCH : Fume hoods equipped with temperature detection and automatic extinguishers with CO₂ :

Room 1438 (3 fume hoods)	room 2438 (5 fume hoods)	room 3238 (3 fume hoods)
Room 3430 (7 fume hoods)	room 3438 (4 fume hoods)	room 4238 (2 fume hoods)
Room 4415 (3 fume hoods)	room 4432 (2 fume hoods)	room 4438 (2 fume hoods)
Room 5230 (4 fume hoods)	room 5430 (3 fume hoods)	room 5438 (3 fume hoods)

- Theses fume hoods are the only equipped with a system allowing to detect a fire ignition within the fume hood. All other fume hoods do not have any detection.

- Above a critical temperature of 60°C, an automatic extinction with CO₂ switch on and the alarm is transmitted to the firemen.

- Excepted during the manipulation, the window have to stay **permanently** closed.

Appendix 6

EMERGENCY MEANS AT THE BCH AND AT THE CH

Fire defense :

- Are available close to the entrance door of the laboratory:
 - ° a extinguisher of 5 kg of CO₂.
 - ° a safety bucket with sand.
 - ° a safety blanket.

- Some fume hoods are equipped with an automatic extinguishing system (see appendix 5).
- one emergency button transmitting the fire alarm to the firemen.

At the BCH, each section includes also

- ° a fire-hose nozzle.
- ° two extinguishers of 5 kg of CO₂.
- ° a portable lamp for poor visibility (heavy fumes or power cut).
- ° an extinguisher cart of 20 kg of CO₂.

Showers

- Each laboratory has a rinse-eyes close to the sink to clean a small portion of body (eyes, small portion of skin).
- Each half-sector (sections 2 and 4) offers a high flow safety shower (60 l/min !) for a massive cleaning or to extinguish a clothing fire. Showers are placed in the middle of each half sector.

First aid equipment

- At the BCH, each sector offers a safety cupboard marked with a green cross.
- The cupboard contains
 - a pharmacy box
 - two protective masks
 - two high protection of gloves
 - a bucket to absorb solvent spill
- The Safety delegate has to organize the verification of the content of the safety cupboard. Each missing, used or broken item is bring to the chemical shop.

EXTINGUISHING MEANS AT THE CH

Laboratories

- Fume detectors and/or a sprinkler system.
- Extinguisher with CO₂.

Lobbies

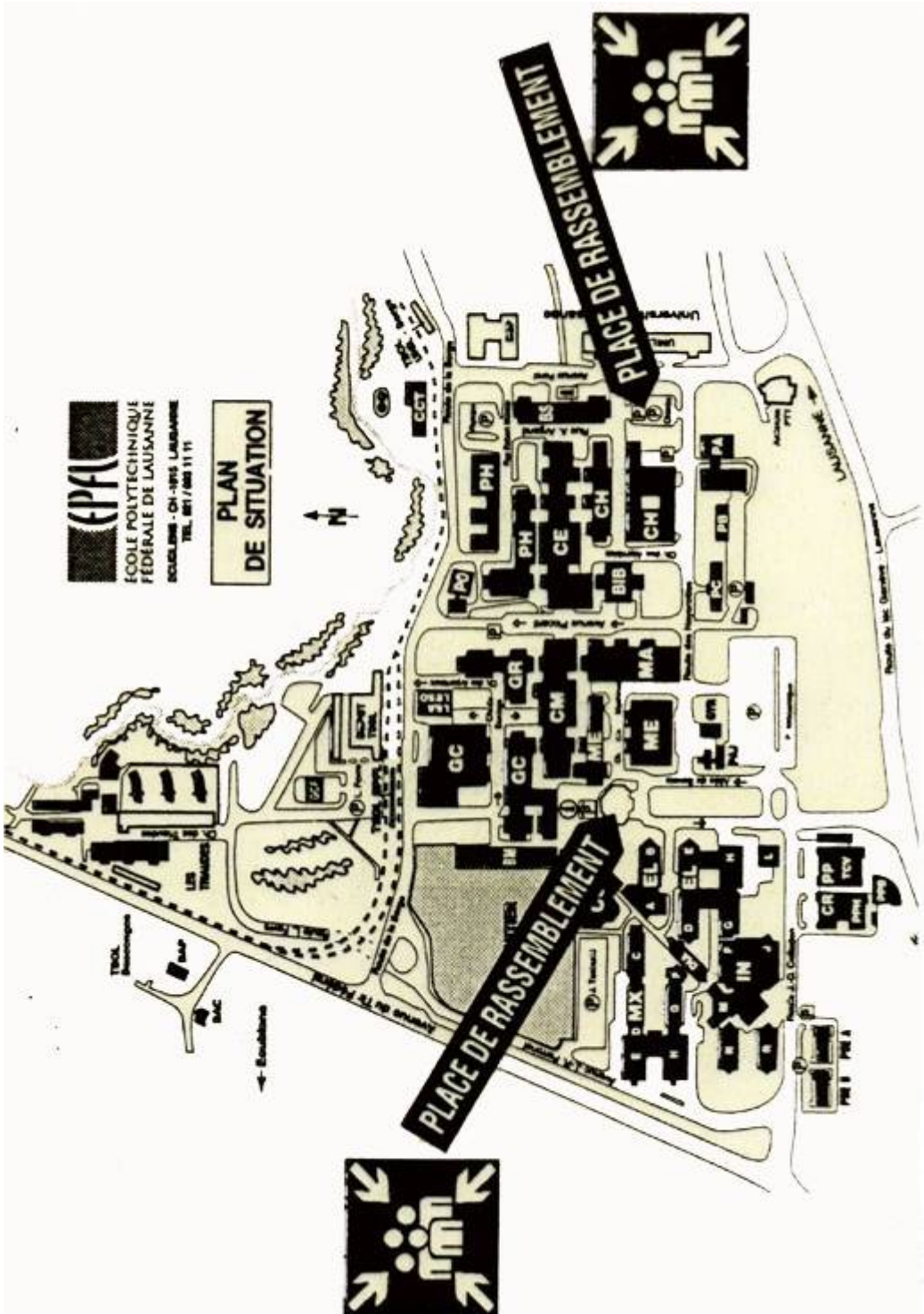
- Fume detectors and/or a sprinkler system.
- At the end :
 - Red emergency button connected to the firemen.
 - Yellow emergency button to stop natural gas.

NB : En case of fire alarm, the natural gas supply of the building is closed.
- Places with fire-hose nozzle and Light Water or powder extinguisher.
- Usually, each laboratory has a safety shower. Supplemental showers are available at the end of the safety exists.

On the EPFL campus

- A firemen team of 50 people including 20 people trained to bare respiratory equipments.
- Emergency vehicules fully equipped with rescue material.
- Intervention des pompiers de Lausanne en cas de sinistres importants.

EVACUATION : PLACE OF ASSEMBLING



INSTRUCTIONS FOR THE USE OF SAFETY MASKS

Never forget the the safety mask Dräger Panorama Silicon :

******* IS NOT ADAPTED FOR THE FIRE DEFENSE*******

Each mask is equipped with a safety filter Dräger combined A2B2E2K2Hg-P3. This combinaison allows a protection against the bellow categories of substances :

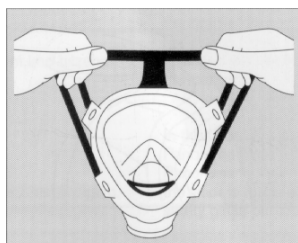
A : gas & organic vapors (Eb. > 65 °C)
 B : gas & inorganic vapors (expl. Cl₂, H₂S, HCN)
 E : SO₂, HCl

K : NH₃
 Hg : vapors of mercury
 P : particules

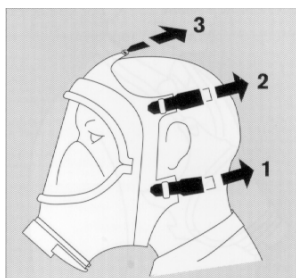
You must be aware that this mask gives :

no protection against CO, CO₂ and NO_x

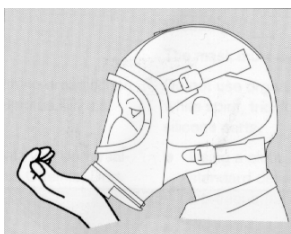
For each use, follow points 1 to 4 :



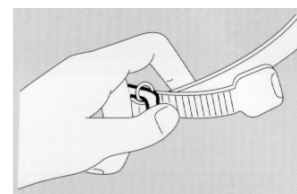
1. exist the mask of the protective bag, remove le filter cork and stretch the straps.



2. bear the mask, strangle the straps 1, de la nuque, 2, des tempes, 3, du front.



3. Check the tightness/leak-proofness by pressing the filter hole with the palm of the hand.



4. After use, release the closing of each strap before removing the mask.