Audit guidelines

Support for the COSEC

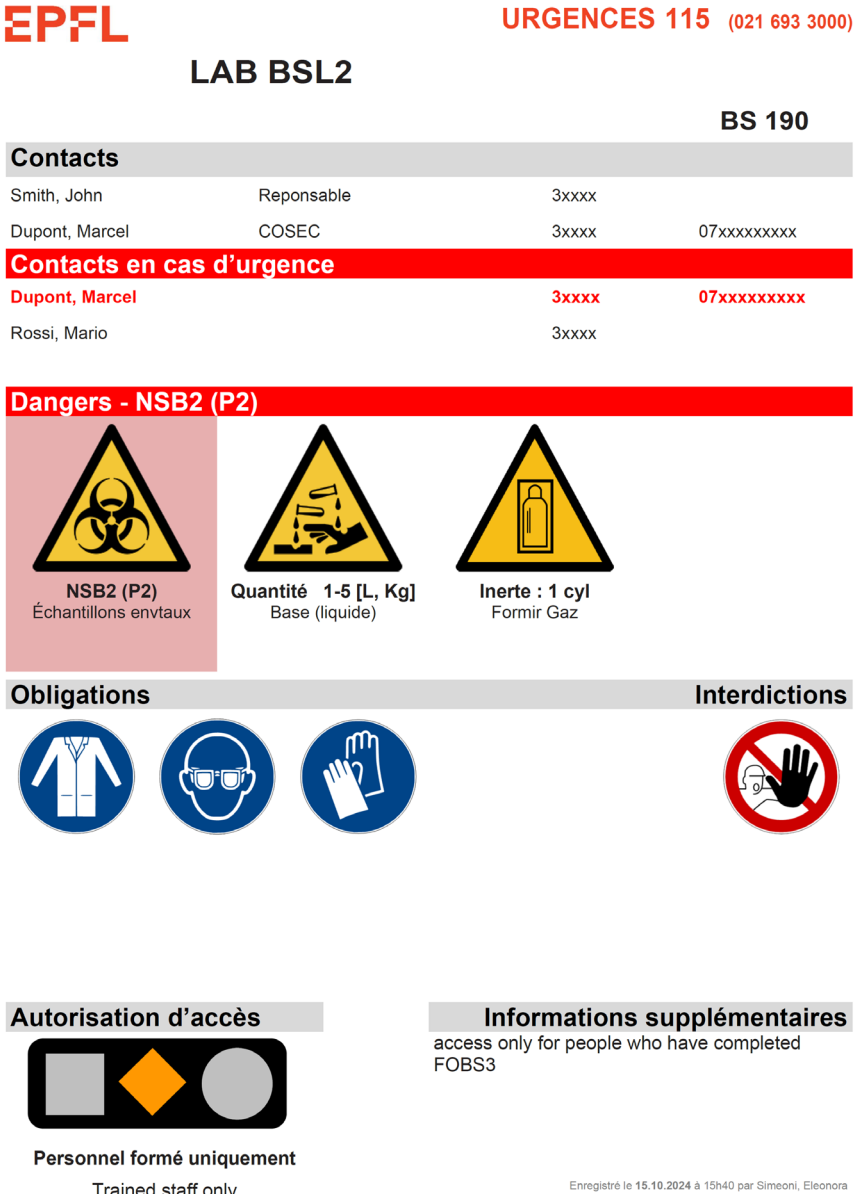
EPFL

VPO-SE OHS
Occupational
Health &
Safety

Table of content

1. Door safety data sheet

- A door panel must be displayed on **each laboratory door**.
- The door safety sheet lists the emergency **contact numbers** and gives information on the **hazards** present in a lab as well as related **obligations and interdictions**.
- Please refer to the Door Data Sheets web page for more information on symbol selection.
- The information must be updated each time there is **a major change of data/activities** (hazards, occupants, phone numbers) or **at least once a year.**


EPFL

URGENCES 115 (021 693 3000)

LAB BSL2

BS 190

Contacts

Smith, John	Reponsable	3xxxx	
Dupont, Marcel	COSEC	3xxxx	07xxxxxxxxx

Contacts en cas d'urgence

Dupont, Marcel	**3xxxx**	**07xxxxxxxxx**
Rossi, Mario	3xxxx	

Dangers - NSB2 (P2)

NSB2 (P2)
Échantillons envtaux

Quantité 1-5 [L, Kg]
Base (liquide)

Inerte : 1 cyl
Formir Gaz

Obligations **Interdictions**

Autorisation d'accès

Personnel formé uniquement
Trained staff only

Informations supplémentaires

access only for people who have completed FOBS3

Enregistré le 15.10.2024 à 15h40 par Simeoni, Eleonora

EPFL

OHS Occupational Health & Safety

2. Emergency equipment

- Basic emergency equipment must be **present**, in **working order** and must be **controlled regularly** to ensure good functioning:
  - Eye washes, pharmacies and spill kits are controlled by the COSEC.
  - Fire extinguishers, fire blankets and safety showers are controlled by the DSE.
- All emergency equipment must be **indicated with labels**.
- Access to emergency equipment and emergency exits must be **free 24/7**.




3. General order

- Work benches must be **kept tidy and clean** (a bench is not a storage area).
- The floor must be kept **free of any obstacles**.
- No **eating or drinking is allowed** in the laboratories.
- No plant in biological laboratories.
- Decrease the **thermal load** as much as possible (no unused combustible material stored in the lab).

4. Safety equipment (i)

Fume hoods - behavioural and technical aspects

- The fume hood must be **free from clutter**. Only chemicals and tools currently in use are allowed in the fume hood.
- All objects used in the fume hood must be kept ≥ 15 cm from the edge.
- The sash must be **closed when no one is working** and **below shoulder height or lower during work.**

What should you check regularly ? Call 34000 if the fume hood needs to be repaired.

- Is the sash (or one of the side windows) damaged? Is the sash stopper broken?
- If present: is the magnehelic indicator in the orange or red zone? (Check the orange arrow; not the black one).
- Do you suspect that the air-flow might be insufficient?
- Is there a low flow alarm triggered?

4. Safety equipment (ii)

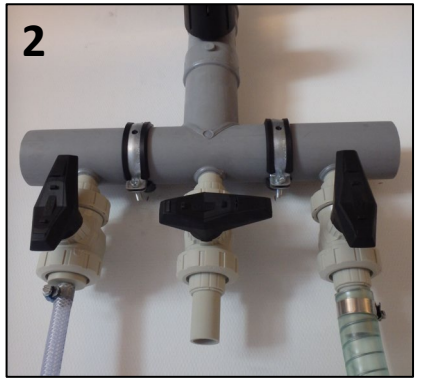
Gloveboxes - use the support documents available here.

- One person must be appointed as the person in charge of glovebox maintenance.
- A **logbook** must be kept up-to-date with **all maintenance items** (e.g. oil change, date of last regeneration, glove change, etc.);
- The regeneration exhaust line, the vacuum line and the purge line (if present) must **all be connected to the ventilation**. All connections must be secured with a clamp.
- Oil-pumps must be stored in a **retention tray**; the **oil must be changed regularly** (~ every 4 to 6 months or after every regeneration).
- The glovebox must be **free from clutter**; only chemicals and tools currently in use as well as air-sensitive chemicals are allowed in the GB.
- It is **forbidden to use a regeneration gas containing more than 5% hydrogen** (only use forming gas ≤ 5% H_2 in 95% inert gas).

4. Lab equipment (i)

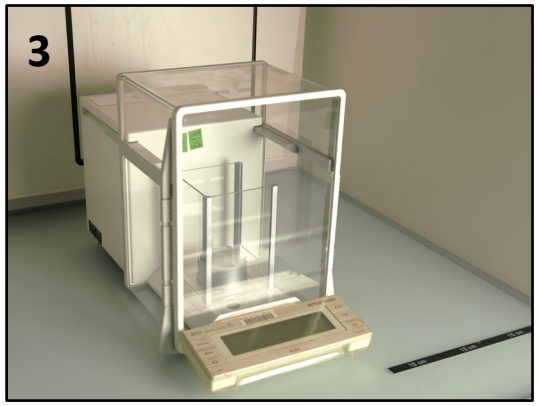
Vacuum pumps (1)

- Vacuum pumps containing oil must be stored in **retention trays**.
- The oil must be changed **regularly** (a dark or milky appearance is a good indicator that the oil must be changed).
- The **exhaust must be connected to a Trident (2)** and secured with a clamp.



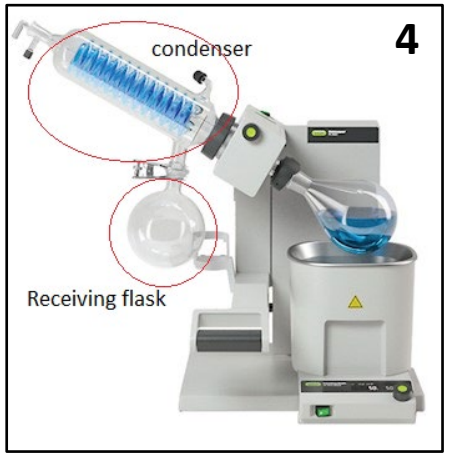
Scales (3)

- The scale must be **clean and free of chemical residue**.
- **Toxic chemicals** must be weighed on a scale placed in a **fume hood**.



Rotavaps (4)

- The receiving flask and the condenser must be protected with **a net or a plastic safety coating**.
- The tubing must be transparent and free from algae.
- The heating bath must be clean without any solid residue, algae or discoloration.



4. Lab equipment (ii)

Fridges & freezers

- The doors and handles must be **clean** and **in good condition**.
- **Storage hazards pictograms** (see page 11) must be placed on the doors.
- Liquid chemicals must be stored in **retention trays**.
- The retention tray must contain the volume of the biggest container.
- Freezers must be **regularly defrosted**.
- Flammable chemicals that must be kept at low temperature must be stored in an **EX fridge/freezer** (explosion-proof).

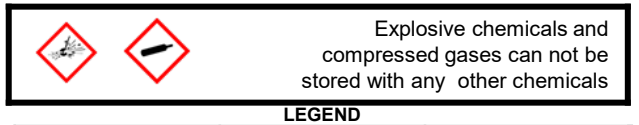
5. Chemical storage (I)

- The **inventory of chemicals** must be done and available.
- Chemical products older than 5 years must be disposed of (if not used, otherwise justify).
- Limit the quantity of chemicals as much as possible.
- Solid chemicals must be separated from liquids.
- Chemicals are stored in **glass containers of up to 3 liters**, or **in plastic or metal containers of up to 5 liters**.
- Chemicals must be **stored according to their GHS pictograms** (oxidizer/flammable/corrosive(acid/base)/toxic) in different storage locations according to their compatibilities (see incompatibility table on the right and Storage help online).
- Liquid chemicals must be stored in **retention trays** (the ONLY exceptions are non-hazardous aqueous solutions with a pH between 3 and 10).

Respect incompatibilities

In case of multiple hazard pictograms the above order should be considered

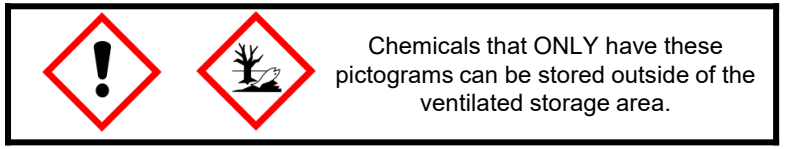
	Oxidizing	Flammable	Corrosive: ACID	Corrosive: BASE	Health hazard / toxic
Oxidizing					
Flammable					
Corrosive: ACID					
Corrosive: BASE					
Health hazard / toxic					



Explosive chemicals and compressed gases can not be stored with any other chemicals

LEGEND

Not Compatible	Store according to SDS Sections 7 and 10	Compatible



Chemicals that ONLY have these pictograms can be stored outside of the ventilated storage area.

5. Chemical storage (II)

- All chemicals must be **labelled** (incl. homemade solutions and synthesized products or waste). **Label indicates**: name of person responsible, name of chemicals, hazards pictograms and date of production.
- All storage locations with chemicals must be indicated with the corresponding **storage hazard pictograms** (black and yellow triangles).

Date:	
Molecule name or Lab notebook ref.: Solvent: Concentration:	Hazard pictograms
Name: contact person	

GHS Pictograms	Hazard Storage Pictogram
	
	
	 Acid
	 Base
	

6. Working with chemicals – behaviour

- All hazardous chemicals must be handled exclusively in a fume hood or glove box.
- All procedures that can release dust, gas or vapours must carried out in a fume hood or in a glove box.
- Only chemicals currently in use are allowed in the fume hood.

- Mandatory **Personal Protective Equipment** (**PPE**) includes:

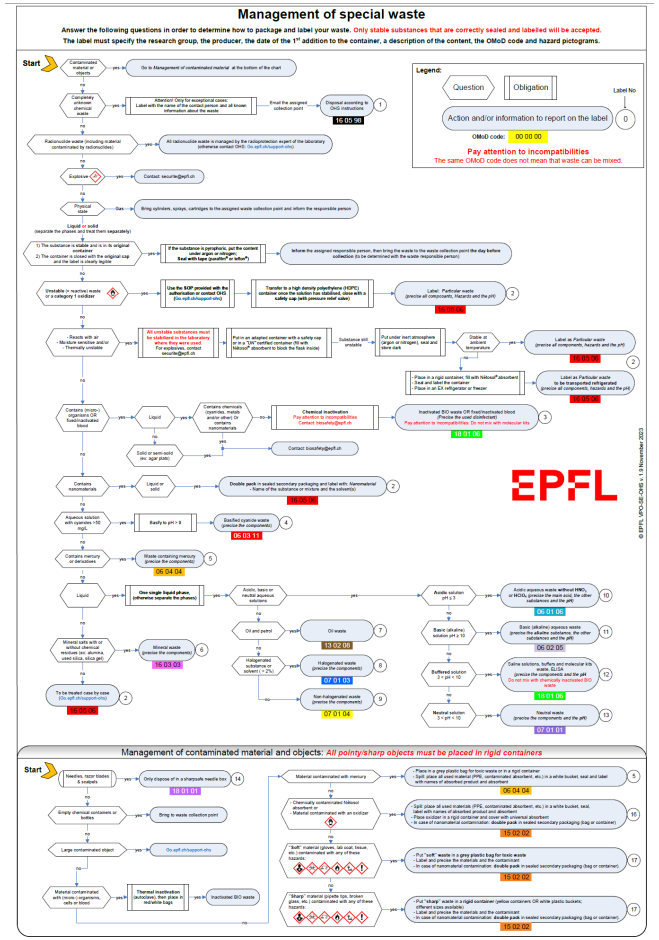
1) Closed cotton lab coat with sleeves down
2) Safety glasses (certified EN166)
3) Closed shoes and covered legs
4) Gloves when handling chemicals (certified EN374 or EN 16523-1)

7. Authorizations & dispensations

- The use of particularly hazardous substances is under authorisation.
- Information is found on the Chemical Authorization webpage.
- An **authorisation request is filled in completely and sent to the OHS.** The authorisation is then given to the user by the OHS after a laboratory visit to control the work procedures, storage and waste management.
- The **authorisation expires**: (1) when the holder leaves the EPFL, (2) at the end of the authorisation.
  A renewal can be issued by the OHS if necessary.

8. Special waste - Visit our website

- Glass containers are not allowed.
- Maximum volume of waste container is **5 liters.**
- Sharp items must be discarded in rigid containers.
- Label must clearly indicate the: **content (composition), associated hazard pictograms, OMoD code*, name of the producer of the waste, research group, and date of first use of the container.**
- Containers must be stored **according to their incompatibility**** in **retention trays** and in **ventilated areas**.
- Waste containers must be **closed** (liquids must have a security cap) and disposed of as soon as they are **80% full**, or **at the latest 2 months** after they were first created.
- **Only stable waste will be accepted**. Any unstable, auto-reactive substance or mixture **MUST BE STABILIZED** in the laboratory where it has been used/produced before being brought to the waste disposal area.



*OMoD code can be found on the Management of special waste document.

** Refer to the table on slide 10.

9. Nanomaterials

- Please find here the online Nanomaterials safety training.
- Nanomaterial activities must be **declared and classified**.
- Personal protective equipment depends on the lab classification.

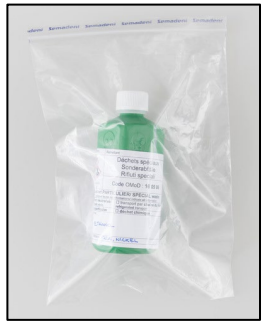
Nano 1

Nano 2

Nano 3

Or

- All waste containing nanomaterial **must be double-packed**; zip lock bags for double packaging are available at campus stores.



10. Biosafety

Biosafety Level 1 (BSL 1 = P1)

- No food, drinks or plants are allowed in the lab.
- Wear the appropriate **Personal Protective Equipment (PPE)**.
- The different type of waste must be **separated** (solids/liquids, genetically modified, etc.).

Biosafety Level 2 (BSL 2 = P2)

- Waste must be **separated** and **inactivated**.
- **PPE is personal** and **must stay inside the lab**.
- Activities must be **confined** (biosafety cabinet, closed vessels, aerosols proof-lids for centrifuge, etc.).

<u>Do not forget</u>:

- **Annual maintenance of the Biosafety cabinet is mandatory in BSL2 (recommended in BSL1)**; It must be organized by the lab itself.
- **Annual maintenance of the autoclave used to inactivate waste is mandatory in BSL2.**
- Lab activities that involve **genetically modified (GM) and/or pathogenic or invasive organisms** have to be notified to the federal office for the environment (contact EPFL biosafety team via the OHS ticketing service).

11. Cryogenics

- When cryogenic liquids are employed, **PPE** (cryo-gloves, goggles or face shield, lab coat or apron) must be present in the lab and used.
- The type of PPE required (goggles versus face shield, necessity of apron etc.) depends on the risk of splashes, the quantity of liquid, the frequency and duration of exposure. Follow the glove chart below.
- Storage areas for cryogenics must be **well ventilated** (at least 5 air renewals per hour).
- Cryogenics must **not be stored underground**.
- The use of cryogenic liquids requires completing corresponding specific safety training, information is available on: go.epfl.ch/cryogenics-hazards

- An **oxygen detector** should be present in case of large quantities of cryogenics:

  ≥ 0.4 liters/m^3 for ventilated area;

  ≥ 0.3 liters/m^3 for non ventilated area.

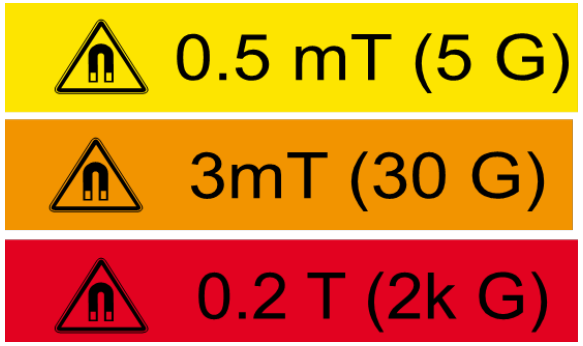
  Contact OHS for an advice before filling in the work order.

Criteria for choosing the type of cryo-gloves

12. Magnetic fields

- **Prior to installing a new instrument** with a static magnetic field, contact OHS for advice on choosing a suitable location.

- Presence of an instrument with a static magnetic field must be announced to OHS for the **field measurement and floor marking**.



- The area around the magnet must be **free of ferromagnetic objects**.

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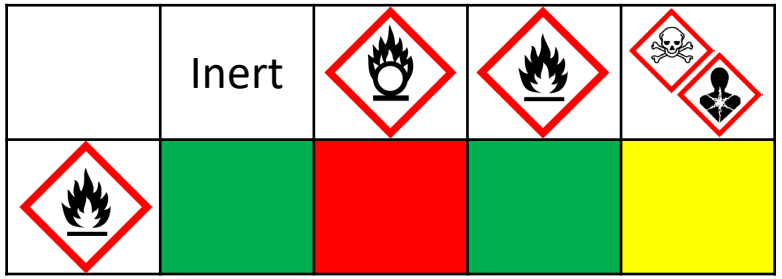
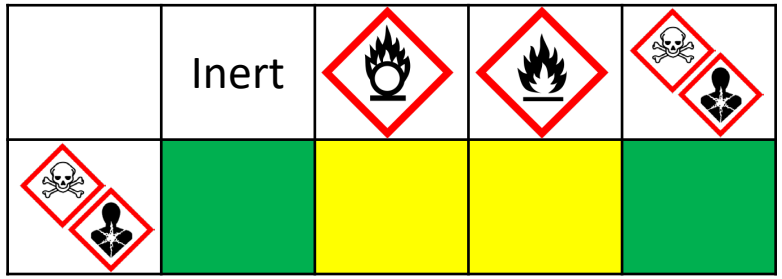
13. Gas (i)

- Please find here the gas safety training.
- Gas cylinders must be stored in a **fireproof gas cabinet** (EI90).
- **Incompatibilities** must be respected, follow the tables below (yellow = contact the OHS).





- All gas cylinders must be **secured**:
  - attached in the **upright position** to the wall or a fixed piece of furniture.
  - at **2/3 of its height** using a metal chain or gas cylinder straps.
  - **individually** = one bond per cylinder.

13. Gas (ii)

- **Storage inside a fireproof gas cabinet** (EI90)**:**
  - Annual maintenance of the gas cabinet is mandatory and will be done by an external company.

<u>What you should check regularly</u>:

- Can you close the door easily?
- Are the joints and seals damaged?
- Are there holes in the fireproof cabinet? Are they sealed?
- Are all the gases identified with a sticker on the gas board (inside the cabinet) and on the gas lines?

Call 34000 if a fireproof gas cabinet needs to be repaired.

Example of an EI90 gas cabinet

13. Gas (iii)

➢ **Storage of cylinders outside of a cabinet:**

- Only authorized when quantities are within the values of the table below.
- For higher quantities, please contact the OHS.

Gas	Quantity (max 4 cylinders in total)
Inert	2 Nm^3
Oxidizer 	0.8 Nm^3 Max 2 cylinders in total
Flammable 	0.8 Nm^3 Max 2 cylinders in total
Toxic 	0.2 Nm^3 Max 2 cylinders in total

➢ **Storage of unused cylinders**

Authorized only if:

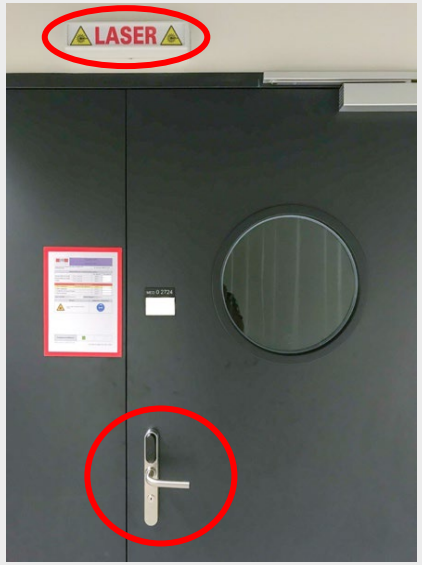
- it is a temporary storage (< 1 week); for longer periods, contact the OHS.
- the cylinder is stored in a cabinet.
- the pressure regulator has been removed and the cylinder is properly capped.

$$1Nm^3 = \frac{Volume(l)xPressure(Bar)}{1000}$$

14. Lasers

Ensuring the access to the room is restricted

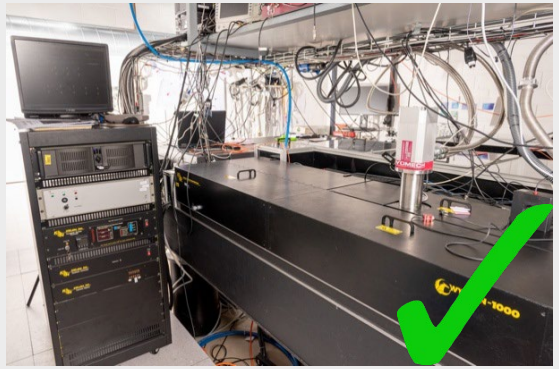
Blinking white light



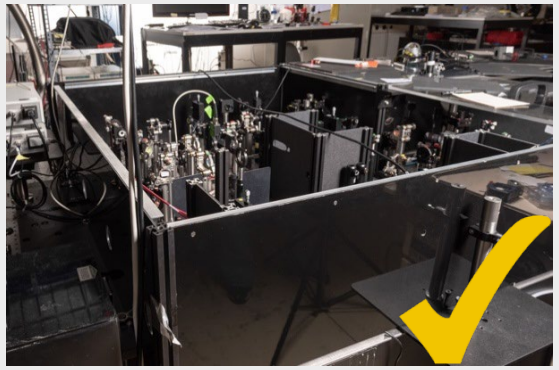
Laser proof curtains at the entrance

1. Camipro access
2. Self-closing door
3. If the key is used, the door handle on the corridor side must be removed

Beam confinement

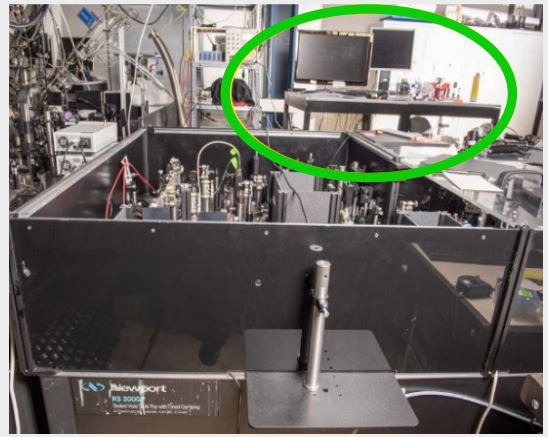


Preferred solution



Acceptable if complete enclosure is not practicable

Eyes of a sitting or standing person must be below or above the beam



No flammable chemicals on the optical table / in the beam path

Access to the laser hazard zone is granted after passing the **Laser training.**
Information is available here: go.epfl.ch/laser-hazards

Laser class	Safety eyewear
3B and 4	**YES** always
3R	Only if beam is invisible (λ< 400nm or λ > 700nm)

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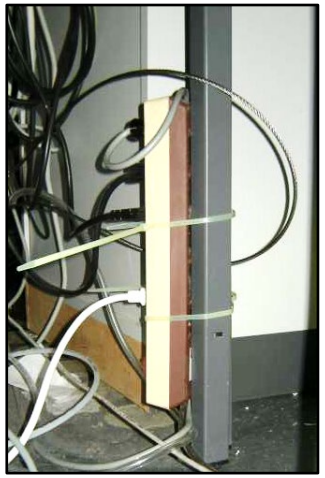
15. Radioactive sources

- All information pertaining to radioactive sources can be found here.
- All **changes of activities** (isotopes, procedures, instruments) must be communicated to the OHS.
- All **new personnel** must register via the following link: https://go.epfl.ch/radioprotection-request.
- The use of **open radioactive sources outside C-labs** must be declared to and authorized by the OHS.
- Before an audit, please update the **list of active users** and the **yearly activities** handled by the group.

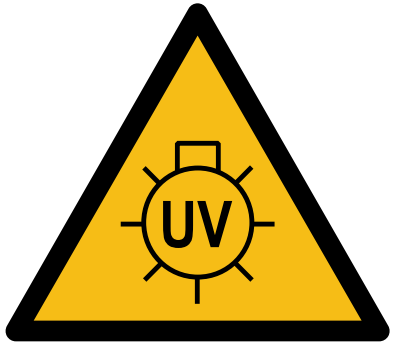
16. Electricity

- No particular measures if :
  - Voltage is ≤ 50 V (AC) or ≤ 120 V (DC)
  - Current is ≤ 0.5 mA
- If either the voltage or current is above these values (incl. high voltage) the experiment **must be protected from access/touch**.
- Do **not overload the electrical sockets**, be aware of the power consumed by your setups.
- Do not leave your electrical sockets on the floor; attach them to a table for example.



17-18-19. ATEX - Incoherent light sources - Noise

- If, during specific experiments, you have to manipulate quantities of flammable solvents > 5 L at once, or particles with diameter < 500 µm, please inform the OHS for an **ATEX evaluation** (**AT**mosphere **EX**plosive).
- If an **incoherent light source** (e.g. UV light) is used in an open access configuration (i.e. it can easily be accessed by a user), please inform the OHS.
- If there is a **high or uncomfortable noise level**, please contact the occupational hygiene team team for a detailed sound level analysis and mitigation measures.

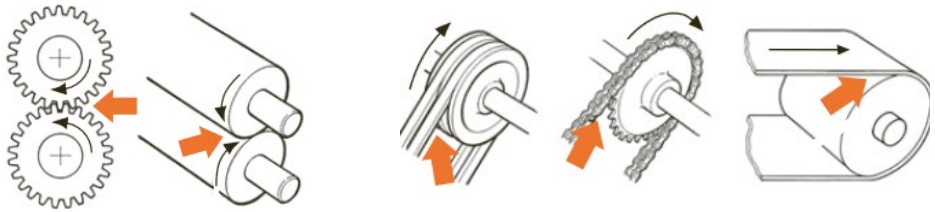


20. Mechanical hazard

Safe working environment:

- Clean floor, 80cm clearance around machine.
- The machine must be installed (secured if necessary) in such a way as to avoid any risk of falling, overturning or slipping.

- Secure transmission elements:
  - Fixed protective screen
  - Safety bar



- Emergency stop button in good condition and easily accessible.

Maintenance:

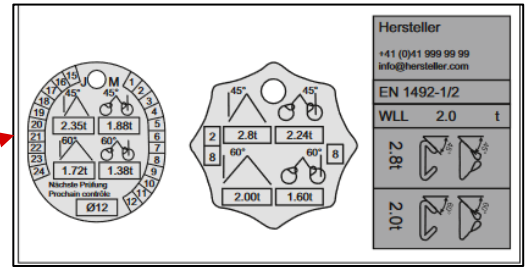
- Maintenance of non-infrastructure equipment is the responsibility of the units.
- Maintenance documentation must be available. If possible, the maintenance due date should be displayed directly on the device.

Safety display:

- Mandatory PPE pictograms are displayed directly on the machine.

Elingues:

- Maximum load clearly and precisely indicated (label or plate).
- Checked once a year by a specialist or accredited company.



Blowguns:

- Use multi-channel nozzles or limit pressure to 3.5 bar.

Got a question ?

Do not hesitate to contact us via the OHS Support Platform.

Occupational Health and Safety (OHS)
Domain Safety and Exploitation (DSE)
CH - 1015 Lausanne
https://www.epfl.ch/campus/security-safety/en/lab-safety/