

WELCOME HANDBOOK

HEALTH AND SAFETY AT WORK



SUPPORT
CREATE
SHARE



General principles of prevention

Labour Code

Article L4121-2

1. Avoid risks;
2. Assess risks that cannot be avoided;
3. Combat the risks at source;
4. Match the work to the worker, especially in terms of workstation design, the choice of work equipment and work and production methods, mainly to alleviate monotonous work and working at a pre-determined work rate and reduce their effects on health;
5. Take account of the state of change of the technique;
6. Replace anything hazardous with something that is not hazardous or less hazardous;
7. Schedule prevention by incorporating, in a coherent whole, the technique, work organisation, working conditions, social relations and the influence of ambient factors ;
8. Take collective protection measures by giving them priority over personal protection measures;
9. Give the workers appropriate instructions.

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1. General

1.1. Goal

This welcome handbook is intended for all Lyon 1 University personnel, the personnel of partner institutions hosted by Lyon 1 University and outside contractors. It sets out the general safety rules applicable on all Lyon 1 University sites for all activities (research, teaching, administration, association, cultural activity, etc.).

It supplements the regulatory texts in force, applicable to the Civil Service, but in no way replaces them.

It is supplemented by:

- + general permanent safety instructions;
- + special instructions specific to each laboratory activity;
- + legal references.

1.2. Intended recipient

This document is available to:

- + every member of the Lyon 1 University personnel;
- + every member of the personnel of partner institutions (CNRS, INSERM, INRA, etc.) working in the Lyon 1 University premises;
- + the personnel of outside contractors;
- + third parties such as visitors.

1.3. Obligations of people present at Lyon 1 University

As everyone is concerned by safety, each individual, regardless of his function, must be aware of the risks and must therefore apply these regulations and all safety instructions scrupulously.

He must become familiar with good working practices and what should be done if there is a problem. Any breach of these regulations can lead to sanctions, in application of the Lyon 1 University internal regulations.

Compliance with the following bans is especially important:



- + no smoking or vaping inside any building and outside near at-risk equipment or premises (chemical or gas product storage rooms, etc.);



- + no parking (only use the spaces provided for this purpose). Do not occupy spaces intended for the disabled nor fire brigade access lanes;
- + no walking barefoot or running in the corridors;
- + no use of rollerblades, scooters or bikes in the inside passageways.

1.4. Flexitime work

Outside Lyon 1 University opening times (times vary between sites), you should only work on an ad hoc basis and, whenever possible, specifically on tasks which are risk free (writing, calculation, bibliographical research, etc.).

In all circumstances you must:

- + if possible, be accompanied by another person from your laboratory or department to avoid being alone;
- + if you leave an operation in progress, note this on the door along with your name and telephone number (a document template is available on the intranet);
- + if you are working alone: wearing isolated worker protection can be a solution when working alone, but it is a last-resort technical solution which should only be envisaged when no other solution (organisational, for example) presents itself. Consult the safety control room managers before buying isolated worker protection to make sure that it is compatible.

The laboratory is responsible for purchasing and commissioning the isolated worker protection.

- + when leaving the laboratory, make sure you:
 - + **close** all the **windows** and **doors** of the laboratories;
 - + **shut down** whenever possible the **supplies** of unnecessary fluids (water, gas and power supplies);
 - + **switch off** the lights.

1.5. Use of alcohol and psychoactive substances

To control the consumption of alcohol and psychoactive substances in the workplace, the university has set up the GRASP group (Alcohol and Psychoactive Substance Risk Management).

Any use of alcohol or psychoactive substances is prohibited within the institution and may be sanctioned. It is forbidden for anyone to bring or distribute in the institution any alcohol drinks to be consumed (unless authorised specially).

Officers in a state of intoxication, which could seriously impair their physical and mental faculties, will be taken in charge by the emergency services.

This rule may be waived when the staff or users of the institution wish to organise an event during which alcoholic drinks will be served. In this case, a request must be submitted expressly to the Presidency which will state the conditions for organising the said event. It is strictly forbidden to serve alcoholic drinks to people in a state of intoxication during these events.

Only non-alcoholic drinks will be permitted on all the University sites.

Any person who is clearly under the influence of alcohol which is proven, if appropriate, by an alcohol screening test in accordance with the provisions stated above may be disciplined.

Any person who brings alcoholic drinks into the institution without permission may also be disciplined.

2. Organising the prevention

2.1. Presidency

The Presidency of the institution must apply provisions relating to the prevention of professional risks and to safety; it has authority over all personnel (Article 27 of Law 84-52 of 26 January 1984), is responsible for maintaining public order and safety (Decree 85-827 of 31 July 1985) and must ensure the smooth operation of its institutions.

2.2. Department Head

The Department Head must ensure the safety and protection of the health of his officers and compliance with the internal regulations under the attributions and delegations granted to him.

2.3. Prevention Advisor

The Prevention Advisor has the task of assisting and advising the management in implementing occupational health and safety rules designed to:

- + prevent hazards likely to compromise the health or safety of officers;
- + improve working methods and environment by matching the working conditions to the physical fitness of officers;
- + improve the knowledge of safety problems and specific techniques for solving them;
- + make sure that occupational health and safety registers are kept correctly in all departments;
- + prepare and implement the institution's prevention policy;
- + advise the units on their risk assessment and introduction of prevention measures;
- + constitute a set of technical and regulatory documents, apply legislative texts;
- + organise the Health, Safety and Working Conditions Committee;
- + organise staff training;
- + organise dangerous waste management;
- + coordinate the network made up of prevention assistants, PCR (Expert in Radiological Protection), training and information;
- + etc.

The Prevention Advisor coordinates the work of the Health, Safety and Working Conditions Specialized Training.

2.4. Social Administration Committee and specialised body

On 1 January 2023, the Technical Committee (CT) and the Health, Safety and Working Conditions Committee (CHSCT) merged to become the **Social Administration Committee (CSA)**.

This body represents all personnel of the institution and gives an advisory opinion.

It is composed as follows:

- + the President of the Lyon 1 University,
- + the head of human resources,
- + the staff representatives: 10 full members and 10 alternate members

The Social Administration Committee contributes to:

- + the organisation and operation of services;
- + the management guidelines (multi-year strategy for managing human resources);
- + general policies regarding mobility, promotion and career development;
- + the statutory rules;
- + the rules regarding the salary scale;
- + gender equality;
- + the medium-term training policy for staff, and to the training plan;
- + restructuring,
- + major changes affecting health, safety and working conditions (where linked to a departmental reorganisation project);
- + working hours;
- + contribution by the State and public institutions to the funding of complementary health insurance for their staff.

In public institutions with more than 200 members of staff, as is the case for Lyon 1, a **Specialised in Health, Safety and Working Conditions Body (F3SCT)** is set up within the Social Committee. The latter is itself composed of 10 full members and 10 alternate members.

The aim of the F3SCT is:

- + to contribute to the improvement of working conditions;
- + the protection of physical and mental health;
- + the safety of staff at work;
- + the organisation of work and remote working;
- + issues linked to the right to disconnect;
- + systems in place to manage the use of digital tools;
- + the improvement of working conditions and the associated legal requirements.

It is chaired by the head of the institution (or their representative) and includes representatives of the executive team, staff (appointed by the representative trade unions), students (appointed by their organisations) and staff from the Occupational Health Department.

The list of CSA and F3SCT members is available on the Intranet in the Human Resources Bodies & Elections section.

2.5. Prevention Assistants

It is the responsibility of the director of each work unit to ensure the safety and health protection of the agents under his authority, the safeguarding of the property at his disposal and the environmental protection. In this context, he is assisted by one or more Prevention Assistants (PA), as required, for example: one Prevention Assistant per geographical site, per team or per type of risk.

Under the responsibility of his director in terms of both operation and infrastructure, this Prevention Assistant ensures that the laws and regulations in force are applied in his research units, services, departments or components.

Caution: All members of the structure must take an active role in ensuring their own safety and that of their colleagues, users and environment. He has available to him the health and safety register at work (see §5.1) which lists all the observations and suggestions of the agents or users, relating to the prevention of risks

The Prevention Assistant acts as **advisor** and **mediator**. The consideration of safety in the day-to-day activities of the structure is the responsibility of each of its members or, for certain specific activities, persons in charge of it.

2.6. Risk Prevention Service

The Risk Prevention Service is composed of prevention advisers whose missions are defined in the amended Decree No 82-453 of 28 May 1982 on the occupational hygiene and safety, as well as preventive medicine in the public sector, as follows:

- + prevention of dangers that could compromise the health and safety of the agents, within the framework of prevention actions, defined by the head of department;
- + improved methods and work environment by adapting working conditions according to the physical fitness of the agents;
- + the deepening of the knowledge of the security problems and the techniques to solve them;
- + a good record keeping.

Department Head President's Prevention Advisor

Delphine BOURGOIS

Prevention advisor

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Science Sector

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Prevention advisor

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Risk prevention technician

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2.7. Preventive Medicine

The role of the Preventive Medicine Department is to prevent any impairment in the health of officers due to their work. It runs occupational health actions to protect the physical and mental health of workers throughout their professional careers.

The prevention doctor advises the administration, officers and their representatives about:
improving living and working conditions in the departments;

- + improving living and working conditions in the departments;
- + general hygiene in the department's premises;
- + adapting workstations, techniques and work rates to the human physiology;
- + protecting agents from all nuisances and risks of work accidents or occupational illnesses or of a professional nature;
- + occupational health information.

Health Sector

+ Doctor :

Dr Anne-Cécile PAOLI

+ Nurse :

Marine BENEDETTI

☎: 04 78 77 72 56

+ Secretary :

Corine BONNEL

☎: 04 78 77 75 77

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+ Nurse :

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Science and INSPE Sector

+ Doctor :

Dr Thérèse DE MALLMANN

+ Nurse :

Régine MUSTARDA

☎: 04 72 44 82 55

+ Secretary :

Eve GENTILI

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6 rue Enrico Fermi

Bâtiment Paul DIRAC

69622 VILLEURBANNE



Paul DIRAC Building - Medical Service

2.8. Social Service

You can contact the social service for any difficulty relating to any problem that may be:

- + professional ;
- + personal ;
- + family-related ;
- + economic.

The social service is aimed at every personnel (tenured, contract worker or PhD student).

The service is work field specialized. It aim to make worker's induction easier.

The Social Assistant is available to members of University staff for:

- + listening;
- + advice;
- + help;
- + support.

The Social Assistant is submitted by the professional confidentiality law (art 226-13 Penal Code.).

You can contact the Social Service, using the contact details given below, or using the generic email address ssocial.personnels@univ-lyon1.fr.

Department Head

Laurence MARTIN

+ Mail:

✉: laurence.martin@univ-lyon1.fr

+ Phone:

☎: 04 72 43 11 01

Rockefeller & La Buire

Hafida MAKHLOUF

+ Mail:

✉: hafida.makhlouf@univ-lyon1.fr

+ Phone:

☎: 04 78 77 71 71

2.9. Psychosocial Risks

The President must prevent psychosocial risks (violence, harassment, addictions, etc.). These can affect health (cardiovascular diseases, muscular skeletal problems, anxiety, depressive disorders, accidents, suicides, etc.) and the organisation (work stoppages, reduced individual and collective activity, loss of vigilance).

These risks, listed in the single document, should be dealt with by suitable preventive actions affecting mainly the work organisation.

The circular of 4 March 2014 on combating harassment in the Civil Service sets out the new provisions relating to the offence of sexual and moral harassment and their impact in the three aspects of the Civil Service. The circular also recalls that suffering created due to these actions within the administration makes upstream preventive measures essential.

Lyon 1 University has set up a system for reporting situations of discrimination, harassment and sexist and sexual violence: <https://signalement.univ-lyon1.fr>

The occupational psychologists at the University of Lyon 1 offer individual counselling or psychological support adapted to the needs. The intervention is centered around the "work" sphere and is aimed at all University agents.

Occupational Psychologists

Elie LABORIE

+ Mail :

✉: elie.laborie@univ-lyon1.fr

+ Phone :

☎: 04 72 43 12 06

Victoria MARION

+ Mail :

✉: victoria.marion@univ-lyon1.fr

2.10. Occupational Health and Safety Training

Specific training is compulsory for all staff.

- + when starting a new job;
- + when changing jobs or techniques (new risks);
- + in the event of a serious work accident or occupational illness;
- + in the event of repeated accidents;
- + at the request of the prevention doctor.

This training will cover:

- + work execution conditions;
- + measures to be applied in the event of an accident or fire;
- + liabilities incurred.

Numerous other training courses are organised or can be organised:

- + exercises in handling extinguishers;
- + first-aid training;
- + movement and posture training;
- + use of specific equipment (nacelles, fork lifts, etc.);
- + electrical accreditations;
- + specific training in laboratory risks (chemical, biological, radioactive, etc.);
- + etc.

All available training courses can be found on the intranet under the Human Resources Department heading "Staff training".

3. Safety in the buildings

3.1. Presentation

The Safety Department is developing a quality approach for managing the safety and security of staff and users. It is particularly active in the area of fire safety and personal assistance.

3.2. Warning methods

How do you contact the safety control room for an emergency?

EMERGENCY

+ Internal:

☎: 30

+ External or mobile:

☎: 04 72 44 79 74

Are all sites involved?

- + the external number is valid on all the Claude Bernard Lyon 1 University sites La Doua, Rockefeller, La Buire, NeuroCampus, Lyon Sud, the IUT sites, the INSPE sites, Gerland and the Observatory;
- + the internal number is valid on the following sites: La Doua, Rockefeller, Lyon Sud, La Buire and the IUT site Doua and Gerland.

When can the safety control room be reached?

Using these two numbers, you can reach the safety control room **round-the-clock** and **every day**.

Which types of problem should be signalled to the safety control room?

- + assistance to people (dizzy turn, accident, etc.);
- + chemical, biological or radioactive intervention, etc.;
- + outbreak of fire;
- + gas leak.

How can the control room be reached for information or a non-urgent request?

LYON SUD

+ Internal:

☎: 618 61

+ External or mobile:

☎: 04 78 86 18 61

LA DOUA

+ Internal:

☎: 316 20

+ External or mobile:

☎: 04 72 43 16 20

ROCKEFELLER

+ Internal:

☎: 728 05

+ External or mobile:

☎: 04 78 77 28 05

3.3. Evacuation of buildings

Why evacuate?

Evacuation is essential if an at-risk event occurs within a building.

This event can be fire, spillage, leak or release of toxic products, threats of explosion, general power-cut, natural risk, etc.

Evacuation goals:

- + ensure the safeguarding of human lives;
- + facilitate the intervention by the emergency services.

How to evacuate?

The following are implemented for successful evacuation:

- + material resources;
- + appropriate human organisation.

Material resources:

- + exits (doors, corridors, staircases, etc.);
- + sound and/or visual alarm (lasting 5 minutes);
- + safety instructions and related evacuation plans which state how to act, the emergency numbers, the location of emergency, alarm and warning resources and the assembly point;
- + safety signs and lighting should the normal lighting fail or if there is smoke, to identify the routes, locate the exits and secured areas and ensure visibility of obstacles.

The principles of human organisation:

- + everyone is affected by the evacuation. All the occupants of the building are players in the evacuation, with different statuses:

- + the success of the evacuation is the result of player involvement, information and training as well as procedures introduced and routine drills two or three times a year and their assessment.

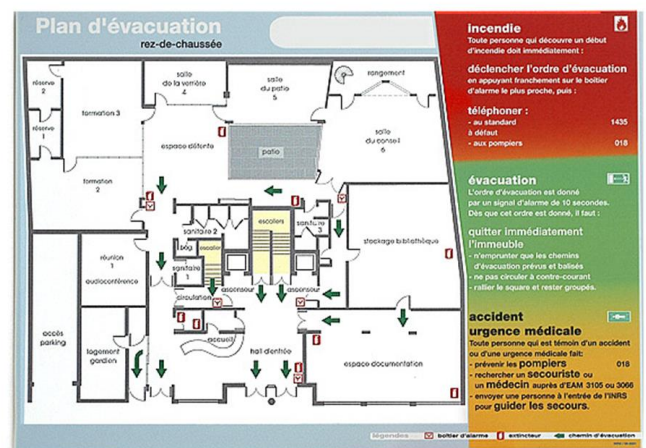
The various players:

- + people designated and trained by building (Safety/Evacuation Manager, Evacuation Coordinator, Evacuation Officers known as leaders and rearguards);
- + in-service teachers;
- + the personnels;
- + the students;
- + the fire safety officers (SSIAP) on the sites with a control station (La Doua, Rockefeller, La Buire).

You can find more information on the University website

The evacuation routes must be clearly identified and marked out with safety lighting. The same applies to the route leading to the secured waiting areas.

This information is consolidated in an evacuation plan for the area in question and posted at least at the said area's entrances and exits.



4. Prevention documents and procedures

4.1. Occupational health and safety register

Every accident, however minor, and every near accident must be signalled to the Prevention Assistant and listed in the occupational health and safety register. This register has numbered pages and is designed to list:

- + the accidents;
- + the incidents;
- + safety shortfalls.

Every time an incident or accident is noted, the register must be countersigned by the director of the unit or the department to show that he is fully aware of it and, where necessary, the corrective and/or preventive measures implemented must be stated.

4.2. Serious and imminent hazard register

This register must be kept by the institution head or his appointed representative. The register is for the use of the Specialized Training Health Safety and Working Conditions (F3SCT). It must be held available to staff representatives to the F3SCT under the responsibility of the institution head.

It has numbered pages that are authenticated by the F3SCT stamp. When there is a source of serious and imminent hazard noted by a member of the F3SCT or via a worker, the registration is recorded in writing in the register.

This registration is dated and signed. It indicates:

- + the workstations involved by the source of the noted hazard;
- + the nature and source of this hazard;
- + the names of exposed workers.

4.3. Right of withdrawal

According to article L4131-1 of the LabourCode, any officer (civil servant or otherwise) has the right to withdraw from his workstation if he has a reason to suppose that his work situation is a source of **serious and imminent hazard for his life or his health** or if he notes defects in the protective systems, without incurring a sanction or salary deduction. He advises his head of department immediately of this decision, who does everything necessary to remedy the situation. The employer or his

representative cannot request the employee to return to work in a work situation with a persistent serious and imminent hazard.

4.4. Risk Assessment Single Document (DUER)

The risk assessment and single document are regulatory obligations. This approach is not an end in itself. It is justified by the prevention actions it is going to spark. Its purpose is therefore in no way to justify the existence of a risk, whatever it may be, but quite the contrary, to implement effective measures to eliminate risks, in accordance with the general prevention principles (Article L4121-2 of the Labour Code). Another regulatory obligation is writing an action plan resulting from the single assessment document of professional risks in all research laboratories, practical work rooms and administrative and technical rooms.

Art. R4121-1 of the Labour Code

The employer transcribes and updates in a single document the results of the assessment of risks for the health and safety of workers which he conducts in application of Article L.4121-3.

The risk assessment is:

- + identifying the hazards through exhaustive listing;
- + analysing how officers are exposed to the hazard: are the prevention and protection methods good, in need of improvement or insufficient;
- + determining the organisational, human or technical prevention actions;
- + scheduling these actions;
- + executing the scheduled actions.

This assessment must be updated at least every year and when any major development decision alters the health, safety or working conditions, when a new risk is potentially introduced (new product, new equipment, new room, etc.) or when additional information on risk assessment in a work unit appears.

This assessment initiative must be conducted under the responsibility of the Department Head (Unit Director, Department Director, Centre Manager, etc.) and is based on the study of workstations. It requires the active participation of officers who are familiar with the gestures, customs and malfunctions of their activity. It must take into account the actual work situations, constraints suffered by the officers and the deviation from instructions, protocols and orders in force.

The EvRP software program is available to all Lyon 1 University work units to produce the DUER. Documents to help in using this software are available on the intranet (Santé & Sécurité →

Prévention des risques → Espace assistant de prévention → Boîte à outils → DUER & Evaluation des risques).

4.5. Intervention of external companies

4.5.1. General

There is an obligation to identify the existence and nature of risks relating to any co-activity caused by an intervention by one or more outside contractors within Lyon 1 University (Article R4512-7 of the Labour Code). A prior municipal inspection is mandatory regardless of the type of operation. Its purpose is to identify the risks, linked to the interference between the university activities and those of external companies, and to define the appropriate prevention measures.

In the context of service, work or maintenance operations:

- + the prevention plan is mandatory for an operation lasting more than four hundred hours in a calendar year or if the maintenance works are considered hazardous works in the meaning of the Order of 19 March 1993;

In the context of building and civil engineering operations:

- + for closed and independent sites, SPS coordination is compulsory.

In the context of loading and/or unloading operations:

- + a safety protocol is required as soon as an external company (transporter) comes to perform, on the Lyon 1 sites, a loading and/or unloading operation.

The University provides models of prevention plan and security protocol, available on the intranet (Santé & Sécurité → Prévention des risques → Espace assistant de prévention → Boîte à outils → Entreprises extérieures).

4.5.2. Case of personnel under private law (EZUS LYON 1, etc.)

EZUS LYON 1 is a private-law subsidiary in charge of promoting scientific and medical expertise and managing collaboration and partnerships set up with the socio-economic sector (industrialists) and with the European Commission.

All laboratories in the University using one or more personnels employed under private law must draw up a prevention plan (more than 400 hours of annual work or hazardous work).

5. Access and circulation

5.1. Access and circulation of people

Some rooms and laboratories can only be accessed by authorised people. The public is not allowed entry. Access to certain areas is via a valid badge.

Outside peak opening times, you should only work on an ad hoc basis, wherever possible specifically on tasks, which are risk free (writing, calculation, documentary research, etc.).

See § 2.4 Flexitime work

The circulation in buildings and evacuation of people must be facilitated. Corridors and staircases in particular must be kept clear (no storage of equipment or materials).

5.2. Access and circulation of vehicles

The Highway Code applies to all Lyon 1 University; there is a speed limit and controlled parking.

Parking is prohibited in front of building doors, fire hydrants, emergency service access routes, delivery areas, spaces marked out on the ground, the grids of the gas bottle storage areas and anywhere that could hinder traffic and in disabled spaces. It is also prohibited to park on the tramlines.

Administrative or disciplinary sanctions could be applied if any rule is breached.



6. Means of prevention

6.1. Pressurised equipment

Equipment will be inspected visually before any use to ensure that there is no:

- + corrosion;
- + abnormal heating;
- + leaking at any point in an apparatus or installation (seal, connector, pressure regulating valve, safety valve, etc.).

It is also important to check that original equipment guaranteed by the manufacturer (keys, seals, connectors, etc.) is being used and that the locking system, the pressure gauge and the valve that prevents a toxic gas from being diffused in the work room (controlled evacuation of hazardous gases outside) are all working properly.

Pressurised equipment and pipes conveying water vapour and liquefied or dissolved compressed gases should be protected by a correctly-tared rupture disc or safety valve to prevent the recipient or piping bursting under an accidental rise in the pressure of the fluid circulating or stored in it.

Gas should be stored and supplied consistently and should comply with the regulations in force and the institution's policy.

Pressurised gas cylinders must be stored outside away from sunlight in a closed, compliant enclosure:

- + they will be held in a rack fixed to a stable masonry component;
- + they will only be moved or used, for example to a mobile welding station, with a suitable trolley;
- + pressure regulating valves will, wherever possible, be fitted with flow restrictors, non-return valves and safety valves. They will be protected against shocks.

Distribution pipes will also be held firmly and clearly identified (using colour code NF X 08-002, NF X 08-003, NF X 08-107).

Pressurised equipment can be tested initially before commissioning then by inspections by a body approved by the Service des Mines and routine re-testing in accordance with the regulations, based on the type and amount of fluid contained in this equipment and their pressure.

When installing pressurised equipment, it will be protected by full screens or fine-mesh metal casings.

Case of steam pressure autoclaves: autoclaves are pressurised equipment and are therefore subject to these regulations. They must be checked every eighteen months. Only trained and authorised personnel are permitted to use them.

6.2. Noise

Vigilance is important for noise-related risks, as the physiological effects of these nuisances cannot be reversed (deafness).

The sound level is an essential component in the correct execution of a task given the significant impact on the individual (fatigue, stress, irritability, etc.).

It is essential:

- + to fix vibrating equipment firmly and check the dampers;
- + not to remove hoods, screens and more generally any physical barrier inserted by the manufacturer;
- + to isolate if possible other people during selective operations;
- + to use absorbent materials on floors, walls and ceilings.

Above an average sound exposure of 80 dBA, the employer is required to provide personal protective equipment (helmet or earplugs appropriate to the type of noise).

The officer must also undergo routine audiometric testing.

Beyond 87 dBA, personal protective equipment must be worn without fail.

6.3. Lighting

The regulations state that natural light and an outside view are mandatory, except where artificial light is necessary in some rooms.

Workrooms, cloakrooms and washrooms must have at least 120 lux lighting.

The minimums are between 120 and 800 lux depending on the activity.

Provisions must also be made to combat annoying solar radiation or risks of dazzling.

Art. R4223-2 of the Labour Code

Lighting is provided to:

- + *Avoid visual fatigue and resulting eye conditions;*
- + *Allow the detection of risks perceptible by sight.*

Art. R4223-3 of the Labour Code

Workrooms must have sufficient natural light as far as possible.

6.4. Electricity

Electrical equipment and installations must comply with the regulations in force. A control bureau, via the DIRPAT, must verify electrical compliance.

Except when being serviced or verified, electrical cabinet doors must be locked.

Only workers with a valid qualification permit can work on the equipment contained in the electrical cabinets.

Accreditation:

To work on any electrical installation, or to work near live elements, it is necessary to have an accreditation certificate. This accreditation title is issued by the Head of Establishment after having followed a training relating to Electrical Accreditation Training Program.

Electrical accreditation is the recognition, by the employer, of the ability of a person under his authority to perform the tasks entrusted to him in safety from electrical risk. It must be regularly recycled.

There are several levels of authorization depending on:

- + the nature of the interventions (troubleshooting, connection, tests, checks, consignments, live work);
- + electrical and non-electrical work;
- + the voltage range of the installations (cf. standard NF C 18-510):
 - + extra-low voltage: $U_n \leq 50 \text{ V AC or } 120 \text{ V DC}$
 - + low voltage: $50 \text{ V AC} < U_n \leq 1000 \text{ V AC or } 120 \text{ V DC} < U_n \leq 1500 \text{ V DC}$
 - + high voltage: HTA : $1 \text{ kV AC} < U_n \leq 50 \text{ kV AC or } 1,5 \text{ kV DC} < U_n \leq 75 \text{ kV DC}$
HTB : $U_n > 50 \text{ kV AC or } U_n > 75 \text{ kV DC}$

Caution: Only **blocks fitted with a circuit-breaker** with a **surge suppressor** ensuring compliance with the power indicated are tolerated. However, this type of device is not intended to multiply. Long-term needs, in rooms with no short-term renovation or electrical safety work, must be met by additional fixed installations incorporating the appropriate protections in the electrical cabinets.

6.5. Hazardous machinery and equipment

This equipment presents mechanical risks for its users (by dragging, falls, projections, cut-offs, crushing, etc.) and risks from electricity, fire, intoxication and burns.

The regulations require the use of machinery and equipment in compliance with the standards in force and carrying CE markings for new equipment. Old equipment must be checked by an approved body.

Authorisation must be obtained to work on machinery from the person responsible for it and a suitable professional qualification must be held.

It is also important:

- + to comply with the safety instructions indicated in the instruction manual for the machinery or equipment;
- + to identify the emergency stop buttons and the main machine components;
- + to wear personal protective equipment, appropriate clothing that is not too voluminous, protective goggles (risks of projection), hearing protection, handling gloves and safety shoes to protect against falling parts or tools; tie long hair back and remove rings, bracelets and chains;
- + not to park in the hazard areas marked out for each item of machinery or equipment;
- + not to remove the mandatory protections;
- + to never work alone;
- + to display the operating and safety instructions.

Important: A machinery compliance check is mandatory before any transfer.

6.6. Handling operations

6.6.1. Manual handling

The Labour Code states that an officer cannot normally carry loads of more than 55 kg (unless fitness is confirmed by the prevention doctor) and that it is prohibited to have a single man carry a load of more than 105 kg.

The limit load for a woman is 25 kg.

It must be possible to use trolleys and sack trucks to limit carrying.

It is advisable to adopt the following positions:

- + the feet surround the load and are slightly offset;
- + the legs are bent and the back is kept straight;
- + the load is lifted by the strength of the legs and thighs, with the arms extended to grasp and hold the load and not to lift it.



6.6.2. Mechanical handling

Items are handled mechanically using lifting machinery like fork lift trucks, hoists, pulleys, gantry cranes, etc.

It is always important to make sure that the equipment used:

- + complies with the standards in force;
- + checked periodically by an approved body;
- + suitable for the load.

The personnel in charge of handling operations must have been trained specifically in operating lifting equipment and have passed a medical fitness test in some cases.

Wearing personal protective equipment (helmet, shoes, gloves, etc.) is mandatory.

6.7. Working on a screen

Certain discomfort can arise from working normally on a screen, including:

- + tingling eyes and blurred vision;
- + headaches;
- + back, shoulder and neck pains.

The disadvantages can be largely mitigated by a few adaptations that are easy to make:

- + correcting sight defects by wearing suitable glasses;
- + complying with medical monitoring;
- + good screen positioning, especially in terms of light sources;
- + average direction looking at the screen parallel to sources of daylight;
- + windows shaded by curtains or blinds;
- + use of light fittings fitted with louvres;
- + clarity of the text displayed on the screen (well-adjusted brightness and contrast, anti-reflection filter);
- + paper documents easy to read and non-reflective;
- + correct layout of different components of the workstation and adopting a correct posture;
- + routine pauses when working constantly on a screen (take a fifteen-minute break every two hours by looking far away from the computer or going for a walk).



7. Carriage of dangerous goods

7.1. ADR Order

The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR Agreement) governs the carriage of dangerous goods by road. The Order of 29 May 2009, as amended, on the land transport of dangerous goods (known as the 'TMD Order') completes the ADR Agreement.

This covers all businesses which:

- + carry dangerous goods by road, rail, waterway or air;
- + carry out packing/shipping, transport, loading and unloading and filling operations along with charterers with a view to or after executing the carriage.

7.2. Transport Advisor

The presence of a safety advisor in companies involved in the transportation of dangerous goods is a regulatory obligation.

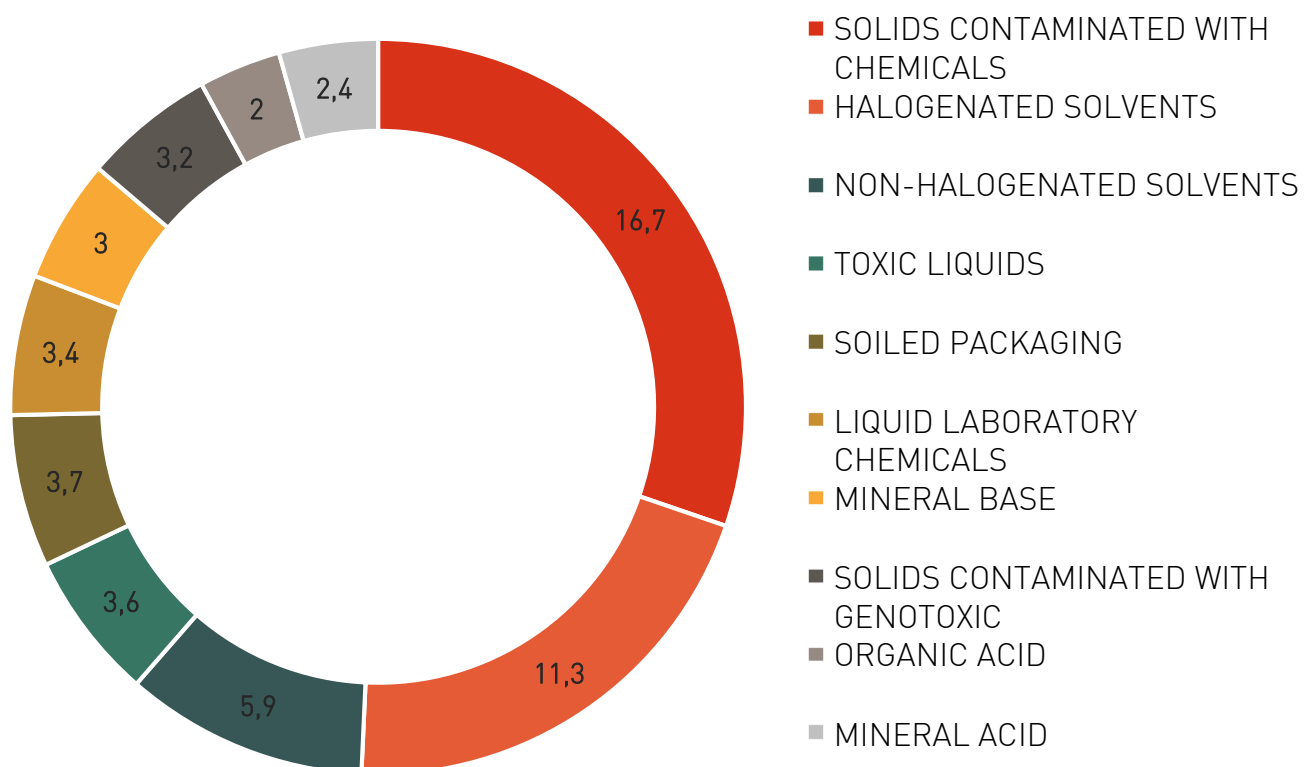
The Safety Advisor in the carriage of dangerous materials is tasked with promoting in the business any action that may facilitate the execution of movements of dangerous goods and help in preventing risks for people, goods and the environment. At Lyon 1 University, he advises on the packing/shipping operations and the carriage.












Lyon 1 University is subjected to these regulations in relation to:

- + the chemical (including nanomaterials), biological and radioactive products ordered and received;
- + chemical, biological and radioactive waste;
- + samples sent for analysis (toxic chemical sample UN 3315);
- + any chemical product sent by road, air or rail.

Please contact prevention.SPR@univ-lyon1.fr for any questions on this topic.

CHEMICAL WASTE EVACUATION IN 2018 (tonnes)



	Class 2.1	Flammable gases
	Class 2.2	Non-flammable gases
	Class 2.3	Toxic gases
	Class 3	Flammable liquids
	Class 4.1	Flammable solids
	Class 4.2	Spontaneously flammable materials
	Class 4.3	Water-reactive materials
	Class 5.1	Comburant materials
	Class 5.2	Organic peroxides
	Class 6.1	Toxic substances
	Class 8	Corrosive materials
	Class 9	Miscellaneous materials and objects dangerous to the environment
		Presents a lasting risk to the environment

Dangerous Goods Transport Labels (ADR Pictograms)

8. Chemical risk

8.1. Chemical substances and products

8.1.1. Definition

The chemical risk is ever-present at Lyon 1 University, both due to the substances and mixes handled for research purposes and to the products used for sanitary or renovation purposes (adhesive, resin, paint, degreasers, etc.).

A first step before using suitable protection means is to identify the hazardous products, mixes or chemical processes and understand their effects on human health and the environment.

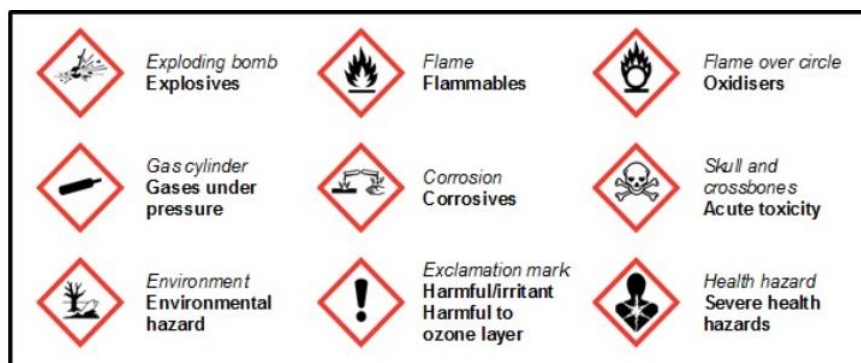
The chemical risk assessment is recorded in the single document. "Toolbox for managing chemical products and waste" is also available on the intranet (Santé & Sécurité → Documents).

8.1.2. Regulations

The so-called CLP regulation sets out the new rules for classifying, packaging and labelling chemical products in Europe. This new system, which implements the international Globally Harmonized System (GHS) recommendations, is gradually going to replace the previous existing European system. Its application will be mandatory for substances end 2010 and for mixes in June 2015.

The INRS (French National Research and Safety Institute for the Prevention of Occupational Accidents and Diseases) site lists the general principles of this system, mainly the items that will appear on chemical product labels: pictograms, hazard statements and precautionary statements.

Caution: In the new REACH regulations, the hazard and safety statements and their relevant codes have been modified. Consult your prevention assistants for further details.



Labeling of chemicals - 9 hazard pictograms according to the international classification GHS (globally harmonized system)

8.2. Genotoxic products

The four classification categories for the CLP regulation (Classifying, Labelling, Packaging):

- + Category 1A: proven Carcinogenic, Mutagenic and Reproductive Toxicity (CMR) effect for humans;
- + Category 1B: assumed CMR effect for humans;
- + Category 2: suspected CMR effect, but insufficient information available;
- + additional category: effects on or via lactation.

Remember that:

- + TPA or tetradecanoylphorbol acetate promotes tumours which act downstream from the effect of a carcinogenic agent;
- + ethidium bromide (EtBr) is a DNA intercalating agent with a demonstrated mutagenic effect.

Minimum genotoxic product handling rules:

- + manipulations must take place in a marked out and signed space and under Collective Protective Equipment (CPE) (ex: fume hood).
- + wearing closed lab coat, safety glasses and gloves is mandatory;
- + weighings in an unventilated closed chamber must be restricted as much as possible;
- + any subsequent handling which may lead to the evaporation or dispersion of the product or create an aerosol must take place under containment (fume cupboard);
- + the solutions must be labelled;
- + if the product is dispersed, the contaminated area must be marked out and the product collected with absorbent paper (in absorbent kit) which is moistened or dry depending on its state (powder or liquid).

8.3. Nanomaterials

The Labour Code does not list any specific features in handling nanomaterials. However, the note dated 18 February 2008 "relating to the protection of health in the workplace against risks from exposure to chemical substances in the form of nanometric-sized particles" recommends taking the same precautions as when handling any hazardous chemical products and substances.

It is advised to use exclusive-use collective protective equipment when handling nanomaterials.

It is recommended ideally:

- + to use single-use PPE;
- + to wear two pairs of gloves (vinyl);
- + to wear a FFP3 type mask (training in wearing a mask is highly recommended).

Laboratories handling or manufacturing substances in the nanoparticle state **must declare annually**, to the Lyon 1 University Risk Prevention Service, the uses of these substances and the annual quantities produced, imported and distributed in France.

Since 2013, all manufacturers, distributors or importers should declare the uses of substances in the nanoparticle state and the annual quantities produced, imported and distributed in France.

Lyon 1 University undertakes to declare electronically all nanoparticle substances handled on the university sites.

8.4. Pregnancy and chemical products

Contact must be made with the prevention doctor at the start of pregnancy. Exposure to certain chemical products like aluminium, arsenic, benzene, carbon monoxide, formaldehyde, lead, mercury, etc. and substances that are carcinogenic, mutagenic and toxic to reproduction is hazardous for the fetus or for conception.

In the CLP Regulation, the CMR hazard statements are represented by the codes H 350, H 340, H 360, H 351, H 341, H 361 accompanied by a "Hazard" warning statement and a "Hazardous to health" pictogram.



8.5. Protection

Collective protection is any equipment, mechanism, instrument or installation which, because of its design, is capable of protecting employees properly against one or more occupational risks and to thus reduce their consequences.

Collective protection can be:

- + technical measures: mechanisation or automation of processes, work in closed tanks and enclosures, emission reduction, pollutant collection and general ventilation;
- + organisational measures: restricting the work time at exposed workstations, product purchasing procedures, flow and storage management, waste management, handling, cleaning and servicing procedures and restricted access to premises.

8.5.1. Ventilation

A good ventilation system can control pollution in the workshops and workplaces. The ventilation installation has to reduce, to the lowest possible level, the quantity of pollutants with recognised or suspected effects on humans:

- + generate sufficient air velocity at the emission point;
- + ensure that air velocity is evenly distributed in the collection area;
- + compensate air outlets by corresponding air intakes;
- + avoid draughts and feelings of heat discomfort;
- + discharge the polluted air away from fresh air intake areas.

8.5.2. Collective Protective Equipment (CPE)

CPE refers to technical devices which isolate a hazard from people potentially exposed to it. It must be used in priority and mainly covers:

- + extraction fume cupboards are ventilated chambers in negative pressure, connected by a terrace extractor fan;
- + recirculation fume cupboards suction the air and discharge it into the laboratory after passing through an active carbon filter (normally specific to a family of volatile compounds). They must be monitored constantly (filter saturation);
- + Adjustable Swivel Arms (ASA); these selective suction systems are recommended to collect dust, odours or vapours with little toxicity generated on small surfaces. They can be fixed to the wall, ceiling or worktop. They require separate ventilation;
- + protective screens; these must be made of a resistant material and positioned in front of every operation to handle chemical products with a risk of projection or explosion;
- + when using highly-toxic products (gas, etc.), a permanent detection system will measure the atmospheric concentration of this product and trigger a sound and visual alarm over a certain threshold.

All this equipment must be the subject of a maintenance contract and an annual Regulatory Technical Verification must be carried out on all the CPEs (fume cupboards, extraction arms, secure ventilated cabinets, etc.).

8.5.3. Personal protection measures

Personal protective measures are devices or resources intended to be worn or held by a person to protect himself against one or more risks likely to threaten his safety or health. Personal Protective Equipment (PPE) is used when introducing collective protective measures is not enough to ensure the safety and health of the officer.

Wearing PPE protects officers against occupational risks (inhalation, skin contact, ingestion, thermal shock, mechanical shocks, projections, etc.) of varying natures - chemical, biological, mechanical, electrical, thermal, ionising or non-ionising radiation (lasers).

Wearing PPE is **mandatory** when handling chemical products. The PPE must be compliant, with **training in how to use it, serviced** and **appropriate**:

It means at least:

- + closed lab coat ;
- + safety glasses with side guards or a face mask or screen;
- + gloves which can withstand the products handled (depending on circumstances, vinyl, latex, neoprene, nitrile or cotton gloves for fine powders, high-protection laminate gloves such as H4 or Silver-Shield);

- + respiratory protection is, when appropriate, provided by filtering cartridge or absorbent cartridge masks appropriate to the polluting products. Autonomous masks can be used for selective interventions;
- + closed shoes.

Dust or FFP3 masks never protect against vapours from chemical products.

8.5.4. Filters

Lyon 1 University stipulates the use of High Efficiency Particulate Air 14 filters (HEPA 14).

These filters have been tested with a minimum effectiveness of 99.9995% particle filtration.

Check the condition of filters regularly to optimise filtration effectiveness.

8.5.5. Good laboratory practices

Good laboratory practices are essential regardless of the products handled:

- + become familiar with the Material Safety Data Sheets (MSDS) before any new handling operation;
- + choose products which are the least hazardous in small packs to avoid transfers;
- + make sure that the safety rule and emergency procedure posters are up to date and known by handlers;
- + work in a suitably-ventilated room;
- + use appropriate behaviour for laboratory work and the fundamental health and safety rules (do not smoke, eat, drink or apply make-up in places where products are being handled, do not wear radio headphones during handling operations);
- + do not wear loose-sleeved lab coat or jewelry and tie hair back;
- + never pipette with your mouth;
- + do not seek to identify a product by its smell;
- + do not attempt to make up unknown mixes which may be incompatible, especially when collecting waste;
- + work with equipment in good condition (especially glassware);
- + store flammable products requiring this in secured, explosion-proof refrigerators (ATEX);
- + never work alone;
- + put signs around the work space when handling products which are carcinogenic, mutagenic and toxic to reproduction (CMR);

- + do not wear lenses.



8.5.6. Storage

Compliance with the following objectives is important for the best possible control of the presence of chemical products in the laboratories:

- + only store the minimum quantity of products compatible with the laboratory's activity:
 - + the risk of incident or accident increases with the storage time and volume;
 - + unused products will become waste generating new risks;
- + limit the number of people exposed to the hazardous chemical products;
- + limit the exposure time to these products by optimising the handling operations;
- + do not create additional risks (slipping, falls, hazardous reactions between incompatible products) due to the storage layout.

In order to limit the quantities present in the storage facilities and comply with the regulations, please consider ways of pooling the management of chemical products between the various users and teams of your laboratory/department.

Please apply the following rules for correctly managing stocks of chemical products:

- + long-term (annual) storage: facility outside the buildings, if available;
- + medium-term buffer storage (on a monthly basis) inside the buildings: in safety-compliant facilities (ventilated cabinets) in premises compliant with medium risk levels;
- + short-term storage (on a daily basis) for handling purposes in a laboratory/practical work room.

Chemical products must be stored temporarily in rooms that are compliant and laid out suitably. These rooms must be fitted, among other things, with:

- + ventilation;
- + containment tanks with gratings and insulation;
- + a fire door;
- + fire detection;
- + signs for intervention of outside emergency services.



To avoid any risks of explosion, fire, projections or hazardous gas emissions, the products are stored in ventilated safety cabinets and arranged according to their compatibility and their material safety data sheet:

- + acutely toxic substances (GHS06) or hazardous to human health substances (GHS08, CMR substances for example) must be stored in locked cabinets which can only be accessed by authorised personnel;
- + explosive substances (GHS01) or bottles/compressed gases (GHS04) must be stored in specific explosion-proof rooms or cabinets (ATEX);
- + oxidising substances (GHS03) are stored away from other products in specific cabinets;
- + flammable substances (GHS02) are stored separately in ventilated cabinets,
- + products with hazardous reactions to water must be stored in specific rooms where there is no risk of contact with water (flood, leaking pipe, condensation, extinguishing water, etc.);
- + corrosive substances (GHS05) must be stored separately to prevent exothermal reactions.

A safe ventilated cabinet, per family of risk (acid, base, flammable, etc.), is recommended.

Caution: when a product falls under several risk classes, the product category for storage purposes must be chosen by the storage manager based on the property he deems to be the most hazardous for the laboratory.

Please refer to the "Storage room" and "Toolbox for managing chemical products and waste" sheets for more details.

	Explosif	Inflammable	Comburant	Réceptif sous pression	Corrosif	Toxique	CMR	Irritant, ...	Nocif pour l'environnement
									
		X	X	X	X	X	X	✓	X
	X	✓	X	X	X	X	X	✓	X
	X	X	✓		X	X	X	X	X
	X	X		✓		X	X	X	X
	X	X	X						
	X	X	X	X		✓	✓	✓	✓
	X	X	X	X		✓	✓	✓	✓
	✓	✓	X	X		✓	✓	✓	✓
	X	X	X	X		✓	✓	✓	✓



May not be stored together



May be stored together under certain conditions



May be stored together

- If a product displays several danger symbols, take into account the following order of priority:

Explosive→Combustive→Flammable→Corrosive→Toxic→Harmful→Irritant→Dangerous for the environment

- Certain products are incompatible even though they display the same symbol. Be informed! Consult the safety data sheets and instructions or contact the supplier

8.5.7. Measures to be taken in the event of accidental spillage

Every laboratory is required to have an intervention kit in the event of accidental spillage and to:

- + mark out and prohibit access to the area in question;

- + before any intervention, make sure that you are protected properly: closed overalls, gloves, safety goggles, closed shoes fitted with overshoes and a cartridge masks depending on circumstances (mainly for volatile liquids);
- + aerate the area;
- + spread the appropriate absorbent;
- + recover the product moving from the outside towards the inside of the contaminated area.

If a solid has been spilled:

- + sweep and collect it carefully taking suitable precautions;
- + rinse with a suitable solvent and recover as indicated below:
- + for a powdery, toxic or irritating powder, cover the solid with filter paper or a damp rag to prevent dispersion;
- + dispose of as chemical waste in a suitable receptacle.

If a liquid has been spilled:

- + if the liquid is volatile, apply the protection measures suitable for gases;
- + if the liquid is not volatile, contain and soak up with suitable inert absorbents (absorbent kits - make sure that the kit is complete and its location is known to all) then collect the absorbents in a sealed receptacle.
- + dispose of as chemical waste.

8.5.8. Chimitheque: chemical product management software

This software package is intended to be used by all units facing chemical risks to take an inventory of all substances and mixes found in the unit in question (hazardous chemical agents, CMR, gas, etc.).

Not only does Chimitheque advise users on the inherent risks in using chemical products (physical characteristics, MSDS), it also executes your individual exposure records, helps you in managing your stocks (warning system linked to expiry dates, min. or max. stocks, etc.).

Contact the Risk Prevention Service via Chimitheque.SPR@univ-lyon1.fr for more information.

8.6. Miscellaneous

8.6.1. Handling of liquid nitrogen

Liquid nitrogen has technical characteristics, which make it difficult to detect its presence:

- + nitrogen is **colourless, odourless** and **has no taste**;
- + at atmospheric pressure, the **temperature of nitrogen in the liquid state is -196°C**;
- + 1 litre of liquid nitrogen produces **680 litres of gaseous nitrogen**.

The risks in handling liquid nitrogen are very serious, even fatal:

- + **overpressure**: liquid N₂ must not be packaged in a hermetically-sealed receptacle. It is prohibited to transport it in a Thermos flask;
- + **anoxic**: an increased N₂ content in the atmosphere of an unventilated room can rapidly nitrogen saturation of tissues accompanied by irreversible effects and even cardiac arrest;
- + **burning**: it is anaesthetic and must be treated as a thermal burn.

Prevention measures to be applied when handling or presence of liquid nitrogen:

- + **It is prohibited to:**
 - + travel in a lift or goods lift with liquid nitrogen;
 - + use hermetically-sealed containers;
- + **It is recommended to:**
 - + **store and handle** liquid N₂ in a **ventilated room**, with **air outlets at ground level** (as cold vapours are heavier than air);
 - + **protect hands and arms with special cryo-gloves**, do not soak the gloves in liquid N₂;
 - + protect the face with a visor and wear safety glasses with side shields;
 - + use a fixed anoxic detector with two thresholds with visual and sound alarm;
 - + check for frost at the plugging system:
if the container is covered with frost, therefore cracked, there is no guarantee that the container is insulated, heat exchanges are accelerated and the nitrogen starts to boil resulting in significant gas releases. It is therefore essential not to enter the room holding the defective container alone.

8.6.2. Handling and use of hazardous products

List of necessary reflexes when handling chemical products:

- + **read the label** before opening the package;
- + ask the supplier for the **material safety data sheet in French (MSDS)**, by fax or via Internet;
- + **assess the hazard** and apply the **collective protective measures** then the **appropriate individual ones** (see the MSDS or the INRS toxicology sheet);
- + **predict the type of waste** that will be generated by the experiments and how it will have to be stored and treated;
- + take **care** during the experiment and use methods which reduce the risks of inhalation (aerosols), ingestion and contact with the skin, eyes and clothing;
- + **avoid using contaminated equipment, instruments, gloves, overalls or clothing** and take precautions after their use;
- + **do not eat, drink or smoke during use**;
- + avoid draughts, cluttered lab benches, voluminous sleeves and unattached long hair;
- + in **accidental spillage** of a liquid chemical product, contain it with absorbents (suitable absorbents otherwise sand, vermiculite, paper, etc.);
- + as soon as a product is removed from its original packaging, **label legibly** and indelibly the receptacles into which it has been transferred or diluted with the product name and concentration, the transfer or dilution date and the risk indications (copying the supplier's labelling faithfully);
- + **replace torn or barely legible labels systematically**.



9. Biological risk

There are two types of risk:

- + **identified risks** (for example, amphotropic retroviruses, whether or not carrying oncogenes);
- + **unknown risks** no less important (remember the history of the HIV virus and blood transfusions, etc.). Basic precautions are therefore essential when handling biological material.

The biological risk relates firstly to the nature of the infectious agent and secondly to the existence of an entry path:

- + percutaneous in an area of unhealthy skin: injury, eczema, scratch or spot;
- + ocular by projection;
- + respiratory by aerosol.

9.1. Containment levels

Good understanding of identified or assumed biological agents which may be present means adopting rules taking into account:

- + the containment premises;
- + the protective equipment;
- + good laboratory practice rules.

All these measures must be consistent with the containment level of 1 to 4 depending on the risk: the same containment level corresponds to each micro-organism risk class.

L1	L2	L3	L4
<p>+ Description of the risk: <u>Low</u> risk for the individual and the community No illness</p> <p>+ Examples : <i>E.Coli</i>, Yeast, <i>Drosophila</i></p> <p>+ Protection: PPE including gloves and overalls based on the results of the risk assessment</p> <p>+ Lab bench decontamination: Every day</p>	<p>+ Description of the risk: <u>Moderate</u> risk for the individual and limited for the community Pathogenic agent which <u>may</u> cause an illness</p> <p>+ Examples: <i>Salmonella</i>, <i>Herpes</i>, Human cell</p> <p>+ Protection: PPE including gloves and overalls based on the results of the risk assessment PSM type II NF certified</p> <p>+ Lab bench decontamination: At each experiment</p>	<p>+ Description of the risk: <u>High</u> risk for the individual and low for the community Pathogenic agent <u>causing serious illness</u> to humans and animals</p> <p>+ Examples: <i>Brucella</i>, HIV, Prion</p> <p>+ Protection: PPE including gloves, overalls, overboots, head covering and mask PSM type II NF certified</p> <p>+ Lab bench decontamination: At each experiment</p>	<p>+ Description of the risk: <u>Very high</u> risk for the individual and the community Pathogenic agent <u>causing very serious illness</u> to humans and animals</p> <p>+ Examples: Ebola virus, Marburg, Lassa and Nipah</p> <p>+ Protection: Complete change (protective suit) PSM type II NF certified</p> <p>+ Lab bench decontamination: At each experiment</p>

9.2. Containment and prevention measures

9.2.1. General

Minimum compliance with the Order of 16 July 2007 is required (see table below), which sets out the obligations following containment, mainly for the layout of handling rooms.

Laboratory design		
	L2	L3
1. Laboratory signalled with the "biological hazard" pictogram	Yes	Yes
2. Layout to include storage for protective clothing and personal protective equipment which is separated from the storage area for workers' personal effects	Yes	Yes
3. Room dedicated to the technical activities separated from the other rooms by at least one lockable door	Yes	Yes
4. Access to the laboratory via an airlock fitted with automatic doors that cannot be opened simultaneously	No	Yes
5. Access restricted to authorised workers only	Yes	Yes
6. Possibility of the workplace hermetically-closed to allow disinfection (fumigation)	Optional	Yes
7. Filtering of the air extracted from the room dedicated to the technical activities (HEPA filter)	No	Yes
8. Filtering of the air entering the room dedicated to the technical activities (HEPA filter)	No	Yes
9. Window closed during handling operations	Yes	Yes, hermetically-closed
10. Observation window or equivalent system fitted to be able to see the occupants	Yes	Yes
11. Means of communication with outside (e.g. telephone)	Yes	Yes
12. Maintaining negative pressure in the technical room in relation to the neighbouring areas	No	Yes
13. Alarm system for detecting any unacceptable change in the air pressure	No	Yes
14. Emergency power supply	No	Optional
15. Emergency ventilation system	No	Optional
16. Mechanical ventilation system for rooms dedicated to the technical activities	Yes	Yes

« Optional »: to be implemented or not, following a risk

Internal layout

	L2	L3
1. Presence of at least one microbiological safety station	Yes	Yes
2. Protective clothing	Yes	Yes, suitable protective clothing and overboots
3. Layout for storing protective clothing in the laboratory or unit	Yes	Yes
4. Shower for decontamination of workers	No	Optional. If yes, proximity to the room dedicated to the technical activities
5. Hand washing: basins with taps that can be operated without using the hands	Yes (1)	Yes
6. Surface impermeable to water, resistant to cleaning and disinfecting agents, with no areas unreachable for cleaning	Yes (floors and walls)	Yes (floors, walls and ceilings)
7. Lab bench surfaces impermeable to water, resistant to acids, bases, solvents and disinfectants	Yes	Yes
8. Effective means of controlling the vectors, for example rodents and insects	Yes	Yes
9. Autoclave present	Optional. If yes, easy to access and if possible in the building	Yes, in the room dedicated to the technical activities, with dual entrance or in immediate proximity (2)
10. Specific basic equipment present in the laboratory (identified equipment)	No	Yes
11. Cages, contention methods, appropriate euthanasia procedures for animal species	Yes	Yes

(1) For the new installations

(2) Introduction of validated procedures for transferring to an autoclave outside the room, providing the same protection and with a controlled sequence

« Optional »: to be implemented or not, following a risk analysis

Operating practices

	L2	L3
1. Storage of biological agents in a secure location (existence of distinct, secure, dedicated and clearly indicated areas for keeping samples, environments containing pathogenic agents and animal corpses)	Yes	Yes
2. Installation of appropriate, validated containment system for transporting samples inside the institution	Yes	Yes
3. Modalities for transporting samples outside the institution in compliance with the regulations	Yes	Yes
4. Handling of infected materials and any contaminated animal in an appropriate containment system	Yes	Yes
5. Use of specific containers for contaminated needles and soiled piercing or sharp objects	Yes	Contaminated needles and piercing or sharp objects prohibited in L3
6. Use every time possible of single-use equipment	Yes	Yes
7. Implementation of techniques reducing the formation of aerosols and droplets as much as possible	Yes	Yes (prevented)
8. Waste inactivation	Optional, before it leaves the institution	Yes, before it leaves the institution
9. Decontamination of any equipment likely to be contaminated (centrifuge, fermenter, microbiological safety station, ventilation and air-conditioning device, etc.) before any maintenance is carried out which could represent a biological risk for the operator. Communication to the maintenance workers of a document attesting to the decontamination	Yes	Yes
10. Markings prior to removing animal corpses suspected of being contaminated by group 3 biological agents, or their container (statement of the presumed disease)	Not relevant	Yes
11. Inactivation of biological agents in the effluents (of sinks and showers) using appropriate means	Optional	Yes
12. Introduction of written procedures describing the working methods and protection and prevention measures aiming to protect the workers against the biological risks, including the list of operations to be carried out under the microbiological safety station	Yes	Yes
13. Introduction of written procedures defining appropriate cleaning and disinfecting means and methods	Yes	Yes
14. Information and training for anyone working in the rooms dedicated to the technical activities, including the personnel in charge of cleaning and maintenance	Yes	Yes

« Optional »: to be implemented or not, following a risk analysis

9.2.2. Lyon 1 University L3 laboratories

Lyon 1 University has L3 laboratories. Access to them is strictly controlled.

Access to an L3 laboratory is only possible with:

- + the authorisation of the occupational doctor;
- + the authorisation of the laboratory management;
- + specific training.

In addition, each laboratory has its own specific rules. It is therefore absolutely essential to read the internal regulations for your laboratory. Similarly, each laboratory has its policy regarding isolated work and work outside opening hours.

Biological waste is evacuated via the DASRI sector (see §15.2).

9.3. Animal houses

Referring Veterinarian

Catherine VOGT

+ **Contact :**

☎: 04 78 77 10 57

✉: catherine.vogt@univ-lyon1.fr

Allergic risk:

- + respiratory (fur, feathers);
- + cutaneous (mouse urine).

Wearing gloves and masks may not be sufficient protection. In the event of a major allergy, do not handle the animals or enter the animal house.

Risk of biting:

- + check the state of health of the animal (no pathogenic germs);
- + treat locally and advise the prevention assistant of the animal house in question;
- + fill in the laboratory's occupational health and safety log;
- + do not panic unnecessarily, as the risk is usually very moderate;
- + prevention: handle the animals gently (no abrupt movements, etc.).

Vaccinations:

- + tetanus ;
- + as the measles virus may be handled in the animal house, it is advisable to check whether you are exposed to this virus and if yes, whether you have been vaccinated against it.

Comply with the special precautions for the A2 and A3.

9.4. Culture glasshouses and rooms

9.4.1. Risks for the users

The risks for the users are basically risks of allergy to pollen and dust. Experience has proven that even if you have never been allergic, you can become allergic if you are exposed repeatedly to pollen (maize pollen is especially allergenic) and to dust. You must therefore protect yourself with a suitable FFP3 mask.

9.4.2. Risks for the environment

We cultivate and produce genetically modified plants. We are obliged under the regulations not to disperse them in Nature. It is therefore essential to:

- + wear throwaway overshoes and overalls before entering the transgenic plant growing areas;
- + identify each sowing with a label showing the name of the owner and the sowing date;
- + moderate watering to prevent any plant health problem (stagnant water should be banned);
- + throw the plants away in bags to be autoclaved (do not overfill them).

Remember to clean the location after every handling operation (especially seed harvesting). Under no circumstances must outside plants be introduced. All plants with plant health problems should be placed in quarantine and forced treated or excluded from growing areas. All plant health treatments must be scheduled and serve the interests of all in the best possible way. Comply strictly with the recommended restricted access after these plant health treatments, which represent a chemical risk.

Comply with the special precautions for the S2 and S3.



9.5. Good laboratory practices

Occupational risk prevention, mainly when handling hazardous products (chemical, biological and radioactive) must include the notion of good laboratory practices. All personnel present and/or handling products must:

- + **limit** the number of people exposed to the hazardous chemical products;
- + handle them under **collective protective equipment**
- + wear **personal protection equipment** (cotton overalls, single-use gloves, cut-resistant gloves, overshoes, protective goggles, breathing apparatus, etc.) depending on the results of the risk assessment;
- + **avoid as much as possible the use of sharp or piercing equipment** (glass which can break, etc.);
- + **avoid aerosols and prevent the risk of spilling liquids** (appropriate holder, plugged tubes and flasks including during centrifuging, etc.);
- + **wash hands systematically after each experiment;**
- + not **smoke** or **vape**, not **eat** nor **apply/remove make-up** in the work areas;
- + not change your contact lenses in the work areas;
- + not pipette with the mouth and do not carry out an odour examination of cultures;
- + **store** only the **minimum quantity** of products compatible with the laboratory activity;
- + **limit** the exposure time to these products by optimising the handling operations;
- + **do not create additional risks** (slipping, falls, hazardous reactions between incompatible products) due to the storage layout;
- + **display the written procedures** on the methods for decontaminating rooms, floors, lab benches, glassware, instruments and protective clothing, etc.
- + An annual regulatory technical verification must be carried out on collective protective equipment.

10. Risks from radioactivity

10.1. Description of risks

There are no fundamental differences between the risks from artificial or natural radioactivity. They are linked to the ionising radiation emitted by the radioactive products, which are especially hazardous, as they ionise the material, i.e. they free electrons from the atoms when passing through the material, especially when living.

The various sources of ionising radiation in the laboratories are as follows:

- + unsealed sources;
- + sealed sources;
- + X-ray generators;
- + particle accelerators.

10.2. Handling unsealed sources

Unsealed sources are those where the presentation and normal conditions of use cannot prevent any dispersion of radioactive substances.

Depending on the radioelement, the users are exposed to two types of risk:

- + the risk of irradiation by external exposure;
- + the risk of bodily contamination (cutaneous or internal when the radioelement has penetrated the metabolism via the pulmonary, cutaneous or digestive paths).

In case of pregnancy:

- + make it known as soon as possible to the prevention doctor for professional monitoring;
- + avoid and limit the handling of radioelements (pregnant women cannot be assigned to work requiring category A classification);
- + suspend all handling operations in rooms containing radioactive sources and waste.

Strict ban on handling radioactivity if breast-feeding.

An administrative procedure (request for registration) must be established on the ASN website before any manipulation. Before validating this request, it should be sent to the prevention advisers so that they can check its content.

10.2.1. External irradiation

It is normally easy to measure objectively.

For β rays, which only travel a few metres in the air, it is easy to provide protection by interposing a Plexiglas screen a few centimetres thick (or an aluminium sheet) or moving away for a distance that will depend on the energy transmitted by the β radiation.

For the γ photons, which have huge penetrating power, the lead mitigates the intensity of the radiation with an efficiency dependent on the energy of the radiation.

10.2.2. Internal contamination

It is far more difficult to detect and measure. Its effects are far more significant as they endure as long as the radioactive molecule has not been eliminated naturally by the organism (notion of biological period) and that it continues to emit ionising particles (in relation to the radioactive period).

Radiation α is in this case the most hazardous for health: highly ionising and with a very short travel, it causes more effects in the surrounding biological material. Once incorporated, the substances are distributed in the organism in preferential sites called target organs (for example, iodine in the thyroid).

In practice, watch out for the risk of inhaling vapours and aerosols (when centrifuging tubes containing highly radioactive substances, place the microcentrifuge under a fume cupboard).

10.3. Handling of sealed sources and X-ray generators

Sealed sources are sources made up of radioactive substances incorporated firmly in inactive materials or those sealed in an inactive envelope. They are strong enough to prevent any dispersion of radioactive substances in normal conditions of use.

Irradiation occurs when the person is in the radiation trajectory and ceases when he leaves it. Hard X, γ or β radiation or neutrons can be emitted.

Radiation emission is continuous from sealed sources. Radiation emission from generators stops when the equipment is no longer supplied with high electric voltage.

Depending on the devices, administrative procedures (request for registration or declaration) must be established on the ASN website. Before validating these requests, they should be sent to the prevention advisers so that they can check their content.

10.4. Individual exposure record (FIE)

This record identifies the people exposed to the ionising radiation and find out the characteristics of the exposure sources, the nature of ionising radiation and the exposure period. The employer can thus satisfy the regulations (Art. R-4451-1 and following of the Labour Code).

Any person exposed directly to ionising radiation when handling radionuclides or using sealed sources, an irradiator or X-ray generators must be advised of the existence of this exposure record and have access to the information it contains. A copy of this record is sent to the preventive doctor.

A quarterly dosimetric monitoring is carried out for agents potentially exposed to ionizing radiation. This monitoring can be carried out by wearing a nominal passive dosimeter quarterly (see photo below).



Passive dosimeter model

10.5. Decontamination

In the event of accidental contamination, you must:

- + look after firstly the contaminated people: remove soiled clothing, wash the skin with soap for a long time, do not rub too hard (the abrasion can aid the transcutaneous contamination) and check for contamination;
- + identify exactly the contaminated areas and objects;
- + clean with pure RBS (remember that it is forbidden to pour radioactive liquids into the sink). Wipe spots with kitchen towel and a clamp (move away from the contamination as far as possible) without spreading it using circular movements from the outside of the spot towards the centre;
- + check regularly with the radiation detector;
- + thrown the contaminated parts of kitchen towel into the specific radioactive waste bin;
- + leave Pipetman ends to soak for 24 hours, rinse, check and start again if necessary;
- + always mark out with adhesive tape provided for this purpose the areas or objects with residual contamination.

In the event of major contamination:

- + advise the expert in radiological protection (PCR);
- + put visible signs around the area or room in question;
- + potentially cover with Plexiglas in the event of fixed radioactivity;
- + record the incident in the occupational health and safety log.



10.6. Use of an X-ray generator

Please refer to the instructions for use drawn up by the Expert in Radiological Protection from the laboratory concerned.

11. Non-ionising radiation

11.1. Infrared and ultraviolet

Ultraviolet and infrared radiation are both non-ionising, electromagnetic and similar to that of visible light.

The consequences of exposing the human body to light are linked to the amount of energy received. This can vary from a simple case of sunburn (UV) to burns and signs of ageing (IR and UV). Serious long-term effects can also be experienced (skin cancer). IR has an immediate effect (burns) whilst UV has a delayed effect. The absorption of UV radiation of more than 310 nm wavelength by the external layers of the eye can be the cause of conjunctivitis. Long-term exposure to UV can cause loss of sight.

Workers can be exposed to UV during:

- + electrophoresis gel readings under UV rays;
- + the disinfecting and sterilising technique for foods, drinks and work areas in hospitals and laboratories;
- + the drying technique in photochemical processes;
- + the phototherapy technique;
- + the welding and lighting technique.

11.1.1. Collective protections

- + visual and/or sound signal indicating that a radiation source is active;
- + source automatically cut off when someone enters the room or when someone lifts a protective hood.

11.1.2. Personal protections

- + wear appropriate protective glasses for the wavelength and having the CE marking;
- + protect the entire surface of the skin by using anti-UV face masks and work clothes (cotton lab coat, gloves with sleeves).

The regulations relating to artificial optical radiation (UV source, LASER, etc.) require that the unit director relies on a LASER Safety Referent (RSL) to assess the risks.

An individual, personalised and specific medical monitoring must be set up when an officer is exposed regularly to non-ionising radiation.

11.2. Electromagnetic fields and radiation and radioelectric waves

11.2.1. Assessing the risks

Extremely Low Frequency (ELF) electromagnetic fields and radiation are characterised by frequencies of between 0 and 10000 Hz conventionally. In France, ELF of 50 Hz (industrial and domestic electricity frequency) are mainly used in the alternators, electricity transmission lines, transformers and electric motors.

The risks relating to this radiation are not yet well known and current knowledge does not confirm a decisive link between the exposure to ELF and the appearance of certain cancers. It is recommended to make known a pregnancy or the wearing of a cardiac stimulator to the prevention doctor.

Radioelectromagnetic waves are characterised by frequencies of between 10000 Hz and 3.10¹¹ Hz (300 GHz) conventionally. They are broken down into radiofrequencies (10 kHz to 300 MHz) and hyperfrequencies (300 MHz to 300 GHz) called microwaves or radar waves. They are used mainly in telecommunications (radio, television, radiotelephone, terrestrial cables, radars, etc.), in the agri-food industry (microwave ovens, etc.) and in the scientific and medical sectors (surgical instruments, imagery and nuclear magnetic resonance spectroscopy with high fields).

Here again, any wearing of implants must be made known to the prevention doctor.

In accidental exposure to high power densities, especially when they are focused, superficial or deep burns can occur.

There is hazard from the electromagnetic field attracting ferromagnetic objects, which moves these objects rapidly in space.

11.2.2. Preventing the risks

It is important to take the following prevention measures:

- + prohibit strictly access to the areas exposed to this radiation to anyone wearing a cardiac stimulator;
- + limit work in the areas exposed to this radiation to the time strictly necessary to accomplish the planned tasks;
- + advise the doctor when the people exposed have a ferromagnetic implant, pacemaker or are pregnant;
- + mark out the hazardous areas with suitable signs;
- + protect the people exposed with reflective or absorbent screens; when using microwave ovens, do not put in metal objects nor flasks or containers sealed closed (risk of explosion). Also check the door seal regularly;
- + delimit the safety perimeters around nuclear magnetic resonance equipment. Metal tools, keys or magnetic cards must be prohibited within these areas.

11.3. LASER

The risks from LASERs are mainly based on their classification determined by their power and wavelength.

11.3.1. Protections collectives

Prevention measures can limit the risks from the experiment design stage.

Collective protection measures mainly relate to organising rooms into "LASER areas" and controlling the beam.

"LASER area" rooms are laid out as follows:

- + the entrance is marked out with standard "Caution LASER" panels;
- + lit "LASER hazard" signs fixed to the entrance where a luminous indicator warns when the LASER is in service and means that crossing the threshold is not permitted;
- + the experiment is isolated by an airlock or partition;
- + there must be plenty of ambient lighting (>500 lux) and the walls must be pale in colour to reduce the diameter of the eye's pupil as much as possible;
- + provide for a specific layout of the room, mainly by removing any reflective items, material which is barely flammable or not at all, matt paint, provide a screen for all the parts in glass (windows), etc.

The LASER and the entire optical assembly must be stable and fixed to the ground.

The trajectory of the beam must be marked out, known and delimited. This control is performed as follows:

- + by enclosing as much as possible (hoods, tunnels or protection tube), by inserting shields avoiding any accidental contact with the beam;
- + by using absorbers (opaque materials) used to interrupt the trajectory of the beam during adjustments and when setting up optical systems to trap the beam directly at the exit or stray reflections. Ideally, the room is painted with matt colours; make sure there are no mirrors or reflective surfaces;
- + by fixing mirrors placed in the path of the LASER beam;
- + fluorescent materials must be used for the LASER beam adjustments;
- + never point the beam towards the access points nor at the eye level of people conducting the experiments (no chair nearby).

11.3.2. Personal protections

Special LASER protective goggles appropriate to the LASER class must be worn without fail. The identification must be engraved on the frame: wavelength and optical density D which depend on the class of the LASER.

It is important never to look at the LASER beam or one of its reflections even with suitable goggles.

Never wear contact lenses, as the LASER radiation can cause combustion of the lens aggravating injuries to the cornea. Jewellery (rings, earrings, etc.) and watches must be taken off.

Provide for specific goggles for adjusting the laser.

11.3.3. Other risks

Using a LASER can cause other risks:

- + electrical from using high voltage, a battery and capacitor;
- + chemical from solvents and colouring agents;
- + fire;
- + noise.

Make yourself known to your prevention doctor if you handle LASERs.

11.3.4. LASER classes

Class 1	Class 1M	Class 2	Class 2M
LASER is safe for all conditions of use that can be reasonably predicted	LASER transmits radiation in the range of wavelengths of between 302.5 and 4000 nm and is safe for all conditions of use that can be reasonably predicted	LASER transmits visible radiation in the range of wavelengths of between 400 and 700 nm	LASER where the vision at the exit of the beam can be hazardous when using optical instruments
Class 3R	Class 3B	Class 3B	
LASER transmits radiation in the range of wavelengths of between 302.5 and 106 nm. Vision in the beam can be hazardous, but the risk is lower than for the Class 3B LASERs.	LASER where direct vision of the beam is always hazardous	LASER capable of producing hazardous diffuse reflections	

12. Fire risk

Combating the risk of fire means introducing technical and organisational measures to eliminate any outbreak of fire and to limit the spread and effects of a fire.

A **fire** is a combustion which emits large amounts of heat, fumes and pollutant gases. The following three elements must be present simultaneously (in the workplace) for it to start:

- + an **fuel** in solid, liquid or gaseous form, i.e. a material capable of consuming itself (paper, cardboard, solvents, hydrocarbons, mains gas, special gases (hydrogen, methane, etc.), alkaline metals) insert concrete examples specific to Lyon 1 University ;
- + an **oxidising agent** which, when combined with the fuel, triggers combustion. This is mainly the natural oxygen in the air;
- + **activation energy** which is going to trigger the combustion reaction (if you want to be really precise, there are six possible forms of activation energy. Thermal: naked flame, spark. Mechanical: friction, overheating. Electrical: short-circuit, overcurrent, static electricity. Biological: fermentation. Chemical: reaction between two incompatible products. Natural: sun, lightning).





Fire risk prevention requires forward thinking before the rooms are used through:

- + the design and layout of locations and work situations sanctioned by administrative authorisation and an approved technical inspection;
- + risk assessment approach by the prevention assistances;
- + the technical, organisational and information/training prevention measures for employees locally or for the entire institution.

Use and handling of extinguishers:

Several types of extinguisher are available to all personnel.

Fire extinguishers differ in the extinguishing agent they contain (water + additive, powder, carbon dioxide, etc.), their weight or their equipment.

Training in how to handle extinguishers is highly recommended for all university personnel.

Extinguishers are emergency equipment. Anyone seeing a fire break out must be able to use them. Instructions for use are screen-printed on each extinguisher. Read them before you are faced with an actual fire.

13. Experimental assemblies

An experimental assembly, regardless of type (electrical, chemical, biological, civil engineering, etc.) must undergo a risk analysis and tests before being handles by the teachers and students. The equipment use for these experimental assemblies must be compliant and verified.

This relates to the risks of direct contact (inhalation, cutaneous penetration, etc.), project of liquid or solid elements, overheating (fire, explosion), overpressure or negative pressure.

14. Layout rules for premises

Adding or modifying equipment, an installation, an activity or a room can cause new risks to appear. Partitions, walls and slabs have fire-resistance properties which must be maintained (watch out for drilling and core sampling, etc.).

Room alterations are likely to modify the work conditions. It is important to consider prevention when the project first takes shape.



15. Hazardous waste

Preventive measures linked to waste, irrespective of the nature thereof, are identical to those described for the activities generating it.

Waste requires specific treatment for disposal without affecting people or the environment.

A producer of waste is civilly and criminally responsible until its full disposal or taking in charge by a company approved by the Ministry of Environment. Only the Waste Tracking Form (BSD) signed by a company approved by the Ministry of Environment for taking charge of waste will release the producer of waste from its civil and criminal liability in the event of grouping.

In order for hazardous waste to be transported by road, the BSD must have been signed by both the haulier and the producer of the waste. The BSD follows the waste all the way to the end facility, where it is either disposed of or grouped with other similar waste for treatment at a later date. A final signature is then added by the end facility, which returns the BSD to the service provider responsible for the waste collection. This entity then returns the BSDs to Lyon 1 University, where they are retained for five years.

It is important that when hazardous waste is handed over to the haulier, it is packaged in a manner that ensures there is no risk for the people responsible for collecting it or for members of the public likely to find themselves in proximity to it.

Hazardous waste must be contained when handed over to the haulier so that there is no risk of affecting the people responsible for the collection.

Art. L541-2 of the Environment Code

Anyone who produces or holds waste in conditions [...] affecting the health of humans and the environment is required to dispose of it or have it disposed of [...].

Waste disposal includes the collection, transport, storage, sorting and treatment operations necessary to recover reusable components and materials or energy [...].

15.1. Chemical waste

The collection and treatment of chemical waste is managed by the Risk Prevention Department, as is the procurement of new containers for packaging such waste.

The collection of chemical waste takes place according to a predefined schedule for each Lyon 1 University site concerned. The schedules for the various sites are available on the University intranet (Health & Safety □ Risk Prevention □ 'Waste' Shortcut).

In order to organise waste collection in the best possible conditions, you will be asked to fill in a form downloadable from the University intranet. In this form, you will declare the quantities you want collected, as well as the quantity of new packaging materials you would like to order. (The deadlines for returning the forms are indicated on the collection schedules specific to each site.) These forms must be returned by email to the following address: Dechets.SPR@univ-lyon1.fr

15.1.1. Delivery

The service provider delivers new packaging materials on the day of collection (to find out the delivery point, please contact your Prevention Assistant or the Risk Prevention Department).

On each pallet or batch, one or several delivery slips indicate the content and unit or department for which the packaging is intended.

15.1.2. Storage before collection

To find out how to store waste before collection within your unit, building or site, please contact your Prevention Assistant.

The following rules must be observed in all cases:

- + waste must only be handed over for collection in packaging provided by the service provider or which you can certify complies with the regulations concerning the Carriage of Dangerous Goods;
- + the packaging must be hermetically sealed, correctly labelled and the producer identified;
- + drums must be filled to **a maximum of 75%** of their capacity;
- + liquids must be stored in correctly sized retention tanks suitable for the chemical products they contain. At the very least, the following must be separated: flammables, acids, bases and CMRs (Carcinogenic – Mutagenic – Reprotoxic);
- + where applicable, follow the procedure for disposing of chemical products from the laboratory point by point, ensuring that incompatible products are never stored together;
- + never hand over for collection waste the nature and/or producer of which cannot be identified, or that would represent a risk for the service provider or the public.

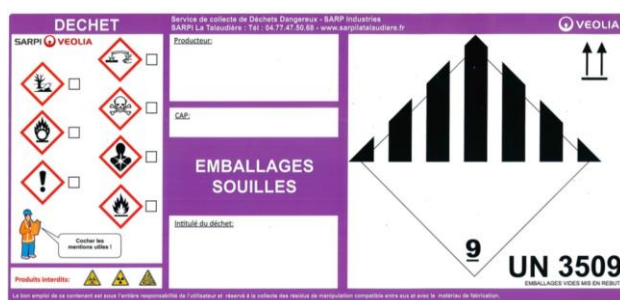
In the event of non-compliance, the University and the service provider may be liable for fines.

15.1.3. Sorting and labelling containers

Waste sorting and the labelling of containers for chemical waste are mandatory in order to ensure compliance with the regulations concerning the Carriage of Dangerous Goods. The service provider must provide new, pre-labelled packaging, as well as separate labels where necessary. These must indicate:

- + the type of waste (e.g. toxic flammable liquid);
- + the corresponding UN code (e.g. UN1992);
- + a specific box identifying the producer (that must be completed);
- + the relevant danger symbols according to the ADR classes (3 and 6 in the example above).

You are responsible for sorting your chemical waste. A logic diagram to help you in this is available on the University intranet. If in doubt, please contact your Prevention Assistant.



Sample label specific to packaging soiled by chemical products

15.1.4. Chemical waste prohibited for carriage

The following products are prohibited for carriage and must under no circumstances be handed over for collection:

- + solid picric acid;
- + Caro's acid (H_2SO_5);
- + Piranha solution ($\text{H}_2\text{SO}_4 + \text{H}_2\text{O}_2$);
- + Aqua regia ($\text{HNO}_3 + 3\text{HCl}$).

In order to be disposed of, these highly reactive products must first be subject to a phlegmatisation or neutralisation process.

These operations are carried out by the service provider during exceptional collections, organised on average twice a month by the Risk Prevention Department depending on the needs expressed.

15.1.5. Nanometric-sized chemical waste

In the case of nanostructured chemical products (powder or liquid possessing at least one nanometric dimension) or any substance soiled by nanomaterials, you are recommended to use a double envelope system and suitable drums, and to dispose of such products via the chemical channel, with the appropriate UN code.

On the basis of current knowledge, nanomaterials are systematically disposed of using the codes UN 2810 and UN 2811 (liquid and solid CMRs).

15.2. Waste from care activities with infectious risks (DASRI)

The collection and treatment of DASRI is managed by the Risk Prevention Department, as is the procurement of new containers for packaging such waste.

The collection of DASRI takes place according to a predefined schedule for each Lyon 1 University site concerned.

The schedules for the various collection points are available on the University intranet (Health & Safety □ Risk Prevention □ 'Waste' Shortcut).

To order new packaging, download the standard order form from the University intranet and return it completed to the following address: Dechets.SPR@univ-lyon1.fr

To find out the location of your delivery point, contact your Prevention Assistant or the Risk Prevention Service.

15.2.1. Sorting of DASRI

DASRI is sorted according to:

- + the nature of the infectious risk;
- + the physical properties of the waste:
 - + soft;
 - + solid;
 - + pointed, sharp, jagged;
 - + liquid.

A logic diagram for biological waste is available on the University intranet to help you determine whether or not your waste needs to be disposed of using the DASRI channel.

As the cost of treating DASRI (excluding new packaging) is a lot higher than that of non-hazardous waste, special attention should be paid to sorting your waste.

15.2.2. Inactivation of DASRI

Depending on the nature of the waste produced, inactivation may be optional or obligatory. This consists in reducing the infectious risk of the waste but without eliminating it completely.

Two processes exist:

Thermal inactivation

Temperature & duration & steam saturation:
138°C for 18 minutes;
121°C for 20 minutes.

Chemical inactivation

In general, bleach or sodium carbonate
bleach with 2% active chlorine
for 12 hours.

Where possible, autoclaving is preferable to chemical inactivation.

Caution: the inactivation of DASRI cannot under any circumstances replace incineration or neutralisation in an authorised facility.

Currently, all DASRI produced by Claude Bernard Lyon 1 University are incinerated.

15.2.3. Mixed waste

- + **Waste both biological and chemical:**

- + To be studied on a case-by-case basis according to the nature of the chemical risk and the nature of the infectious risk.

Examples: animals conserved in formol, bacteria in a culture containing mercury, etc.

- + **Waste both biological and radioactive:**

- + Radioactive channel to be considered. Contact the Expert in Radiological Protection (PCR) for your unit

Examples: dead animals contaminated by radioactive products, contaminated samples, etc.

PSM filters and laminar flow hoods must be recovered and disposed of by the company responsible for replacing the filters. If this company has not recovered your filter(s), please ensure you:

- + pack them hermetically in a bag for DASRI
- + contact the Risk Prevention Service to arrange for their removal.

Some filters are, for example, too large to be directly incinerated and must be treated first (decontamination, etc.).

The method used for their removal will be determined in consultation with the service provider.

15.3. Radioactive waste

The procedures for managing radioactive waste and its fate are known to the laboratory's Expert in Radiological Protection.

In practice, regardless of the type of radioactive waste, you must:

- + keep each radioelement separate;
- + separate liquid and solid waste;
- + not dispose of pointed, sharp or jagged items without protection (special boxes exist for needles);
- + quantify total activity per radioelement in Mbq, label and date the full recipients left to decay;
- + remove any radioactive symbol from non-contaminated packaging and dispose of it as conventional waste.

15.3.1. Short-life radioelements (period ≤ 100 days: ^{32}P , ^{33}P , ^{35}S , etc.)

Solid and liquid waste will be separated in suitable recipients and identified in the laboratories then in the radioactive waste storage facility. Be sure to note **the closing date and the radioelement** on the recipient and leave it to decay for ten periods or so.

After this time, the waste will be treated according to its residual risk (chemical or biological).

15.3.2. Long-life radioelements (period → 100 days: ^3H and ^{14}C , etc.)

This waste is treated by ANDRA, which provides two types of packaging: 30L tight-head drums for liquids and 120L open-head drums (in PEHD or metallic) for solids. These recipients constitute transport packaging and are not designed for internal waste collection (use as an internal bin can damage the closing mechanism). They will be collected **a maximum of 4 years after their date of manufacture** (visible on the recipient).

Several categories of radioactive waste are defined in the ANDRA collection guide:

- + SL for polyethylene scintillation vials;
- + SLV for glass scintillation vials;
- + SI for the most contaminated Incinerable Solids (weakly contaminated incinerable waste must be directed to the Compactable Solid or Non-Compactable Solid categories) (paper, dry cloths, gloves, etc.);
- + SC for Compactable Solids (paper, cloths, gloves, plastics, etc.)
- + SNC for Non Compactable Solids (metal, broken glass and ceramics, soil, gravel, plastics, etc.)
- + LA for monophasic aqueous solutions with a pH of between 2 and 13;
- + LS and LH for solvents and mineral or organic oils;
- + SO Organic and Putrescible Solids (dead bodies, incinerable litter, etc.).

Prior to collection, check that bags and drums are properly closed, weigh the packages, check that the package surfaces are not contaminated and measure their radiation intensity.

Caution: do not put non-radioactive waste in radioactive waste drums: COSTLY!

For more information, contact the Expert in Radiological Protection of your laboratory.

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- + Faculty of Sciences and Technologies
- + UFR STAPS
- + IUT Lyon 1
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Other geographical sites

- + **Lyon Croix Rousse site**
 - + INSPE, Rhône site
- + **Villeurbanne Centre site**
 - + IUT Lyon 1, Villeurbanne Gratte-Ciel site
- + **Roanne site**
 - + Polytech Lyon
- + **Saint-Etienne site**
 - + INSPE, Loire site
- + **Bourg en Bresse site**
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 - + Midwifery Training site

Lyon Santé Est Campus

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 - + Lyon Est Faculty of Medicine
 - + Institute of Pharmaceutical and Biological Sciences (ISPB)
 - + Institute of Rehabilitation Sciences and Techniques (ISTR)
- + **La Buire Domain**
 - + Faculty of Odontology
 - + Lyon Est Faculty of Medicine

Lyon-Sud Charles Mérieux Campus

- + **Gerland site**
 - + Institute of Financial Science and Insurance (ISFA)
- + **Lyon Sud site**
 - + Faculty of Medicine and Midwifery Lyon Sud - Charles Mérieux
- + **Saint-Genis Laval site**
 - + Observatory of Lyon