

EPFL Security concept for laboratories working with biological materials

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1 Scope of application and validity of the concept

This security concept for laboratories working with biological materials has been approved by the Department of Security, Safety and Facilities Operations on 1st December 2016. It constitutes the framework for the organisation and implementation of necessary security measures in accordance with the objectives of the Direction. All units and persons concerned are under obligation to put this security concept into practice according to their respective responsibilities.

2 Security Objectives

1. EPFL agrees to take all security measures necessary to protect its employees, external individuals and the environment against the risks provoked by the activities of the laboratory concerning biological material.
2. Working with biological material in laboratories can present risks for the employees, external individuals and the environment. Additionally, biological material is rarely used alone. It is combined with chemicals, radioactivity or nanomaterials.
3. These experiments require an appropriately adapted infrastructure and specific equipment.

Only with a comprehensive approach to safety can the objective of creating an environment in which personnel can work safely and feel at ease, be met. It is also essential to take all measures necessary to avoid endangering the environment or external individuals, such as visitors, staff of third party companies, members of a staff member's family or the general public.

3 Organisation and general responsibilities regarding safety at EPFL

The organisation of safety and general responsibilities are based on the EPFL internal directive of 3 July 2006 entitled "Responsibilities and functions"¹. This document regulates the measures for health and safety in the workplace.

The EPFL Direction is responsible for health and safety (including biological safety) of the school and its different campuses. The President delegates the following tasks:

- to the Risk Management Committee (CRM): the coordination, promotion of quality and support of safety activities;
- to the Vice Presidency for Operations (VPO): the operational management of safety missions and the implementation and maintenance of safety installations by the Department of Security, Safety and Facilities Operations (DSE).
- to the Vice Presidency for Academic Affairs (VPA): the promotion of health and safety within the framework of education, research and professorial careers;
- to the Schools (as operators): the mission of ensuring that all measures have been taken to prevent incidents and accidents.
- To the Heads of Units: the implementation within their unit of an organisation which can ensure good work practices recognised in their sphere of activity and the improvement of safety conditions by the systematic identification of risks.

The DSE

The DSE involves safety specialists in order to make sure it has the competence and manpower necessary for its mission. Biological safety is ensured by the "EPFL Biosecurity" team, which is integrated into the Occupation Health and Safety (OHS) department for questions of health in the workplace, safety training and laboratory safety.

¹ http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/1.5.1_dir_sante_securite_travail_fr.pdf

Within the Response and Safety service (DSE-SIS) the DSE has an emergency service in which members are trained for any type of immediate emergency (fire, explosion, flooding, gas, etc.) including incidents or accidents involving biological material.

The Facilities Operations service (DSE-EXPL) is in charge of the upkeep of the buildings including security systems, all permanent technical installations, fixed property (chemical fume hoods, ventilated cabinets, etc.), mobile property (for example, lab benches or the laboratory furniture) and all of the electronic installations. It implements all the technical measures necessary for ensuring the health and safety of the staff members inside the buildings, notably in consultation with the “EPFL Biosecurity” team in order to implement specific measures necessary for the use and elimination of genetically modified and / or potentially infectious biological material.

The Schools

The direction of each EPFL School is responsible for the application of measures relating to health and safety in the workplace in the institutes, technological platforms or services related to it. The Direction receives scientific support from the DSE-OHS regarding aspects of laboratory safety, health in the workplace and safety training. They also consult with the “EPFL Biosecurity” team in order to evaluate, notify or authorise all activities involving genetically modified or potentially infectious materials.

Specifically, the DSE-OHS must:

- Provide a risk analysis and identification service in order to help Schools to safely handle the activities lead on their premises;
- Propose solutions to security problems caused by School-based activities (collection and storage of biological or chemical waste, inactivation or destruction of biological material, handling of chemical stocks, installation and manipulation of lasers, handling of nanoparticles, etc.);
- Complete checks and internal audits and, if need be, take exceptional provisional measures such as the closure of the premises;
- Check the updating of the register of dangers by the safety coordinators (COSECs) and provide information for the “Laboratory Hazard Directory” (LHD).
- Identify, evaluate and authorise the biological activities underway in the Schools (by “EPFL Biosecurity”)
- Provide a specific response to issues of Occupational Medicine and Occupational Hygiene within a technical university environment;
- Develop monitoring strategies for the professional environment, adapted to research conditions with the aim of preserving personal integrity, as much for the researchers as for the students and assistant-doctoral students, and thus guarantee the good health of personnel;
- Implement the medical monitoring of individuals who have been exposed to particular physical, chemical or biological risks;
- Teach staff members and students how to cope with generic dangers (fire, accident, theft, assault) and to manage to specific risks that they may encounter in their professional activities. In particular, the DSPS-PS must ensure that staff members are specifically trained in the handling of biological organisms in groups 2, 3 or 4 (genetically modified or not).

The heads of unit (teachers or heads of service)

The head of unit is responsible for identifying dangers and creating a related risk analysis. He/she must ensure the application of security measures within his/her unit, in particularly those linked to activities involving genetically modified biological material or biological material belonging to risk groups 2, 3 or 4. He/She may delegate certain operational aspects of safety to the safety coordinator (COSEC), but he/she remains responsible for these aspects. He/She must announce all activities involving genetically modified biological material or biological material belonging to risk groups 2 or 3 to the “EPFL

Biosafety” team who will provide support for necessary administrative tasks (notifications and / or authorization requests). If the head of unit so desires, he/she may fulfil the role of safety coordinator him/herself.

The COSEC

The COSEC is named by the head of unit who will delegate certain operation aspects of safety within the unit to him/her according to the description of tasks found in annexe 1 of the DSST. The DSE² will organise his/her training. In units which use biological material, the COSEC will also be given the role of “Biosafety Officer” (BSO) according to the FOEN directive “Responsables de sécurité biologique (BSO)³”. The head of unit ensures that the COSEC is sufficiently well informed to fulfil the role of BSO. The “EPFL Biosafety” team can inform and advise him/her regarding training in biosafety. The COSEC/BSO collaborates with the “EPFL Biosafety” team in the management of the biological activities of his/her unit. In case of doubt regarding a biological risk or a measure to be taken, he/she must inform the head of unit and the “EPFL Biosecurity” team.

The premises manager

The premises manager is responsible for one or several premises, for which he/she is the main person of contact. He/She ensures that the staff members who have access to these premises are trained and are aware of the rules to be respected. If necessary, he/she issues access rights to the premises with restricted access. Ideally, the premises manager is a COSEC (with sufficient knowledge to be able to fulfil the role of BSO) or a person with sufficient training to be given this responsibility. If the premises is used jointly by several units, the premises manager will coordinate the safety regulations relating to the activities carried out in the premises with the COSECs for the units concerned. In collaboration with the units who use the premises, he/she will create a list of genetically modified or potentially infectious organisms and/or pathogens used in the premises. He/She will provide a list of chemical substances which require particular precautions (explosive substances, substances which are flammable on contact with water, toxic products, nanoparticle materials, etc.). He/She handles the elimination of waste and ensures that genetically modified organism or pathogenic waste is inactivated.

4 Working with biological materials in an EPFL laboratory

4.1 General principles

The head of unit has the responsibility to be aware of the activities of his/her unit and the associated risks. He/She must ensure that the implemented working methods and procedures are safe (in accordance with the risk estimation) and that the safety measures and procedures which are specific to the activities of the group are ready, understood by all, and subject to protocols. He/She may seek support in the expertise of the DSE-OHS for the identification and evaluation of associated risks and dangers and may seek advice regarding the safety measures to implement. He/She also makes sure that all of his/her staff members are trained and informed so that they may complete their work safely.

If the laboratory handles genetically modified or potentially pathogenic material, the head of unit informs the “EPFL Biosafety” team in due course of the activities which must be announced to the Federal Coordination Centre for Biotechnology according to the procedure defined in the directive⁴ concerning the internal procedure for projects subject to notification/authorisation in accordance with the Containment Ordinance (ContainO⁵) and the *Ordonnance sur la protection des travailleurs contre les risques liés aux microorganismes* (OPTM⁶).

² <http://securite.epfl.ch/cosec>

³ <https://www.bafu.admin.ch/bafu/en/home/documentation/publications.html>

⁴ http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/1.5.3_dir_notifications_autorisations_selon_OUC_fr.pdf

⁵ <https://www.admin.ch/opc/en/classified-compilation/20100803/index.html>

⁶ <https://www.admin.ch/opc/fr/classified-compilation/19994946/index.html>

4.2 Activities involving biological material and living organisms

ContainO and OPTM include clear indications regarding activities involving genetically modified or potentially pathogenic organisms, as well as the duties and obligations of the head of the project. The head of the project (or the COSEC, by means of delegation) must establish and maintain a list of the organisms which are used and stored by his/her unit. Additionally, he/she is responsible for carrying out the analysis of risks relating to the manipulation and / or storing of these organisms and managing their usage (see directive concerning the management of organisms⁷). Authorisation for working with animals in the laboratory is not dependent on the Federal Coordination Centre for Biotechnology, but they must be informed of the use of genetically modified animals.

The “EPFL Biosafety” team must ensure that the risk analysis and the management of microorganisms are carried out in accordance with the aforementioned directive and ContainO. It will also check that the activities are correctly declared and that the notifications or requests for authorisation reflect the activities of the research unit.

4.3 Use of chemical substances

4.3.1 Principles of use

The DSE sets out the terms of use (safety equipment, personal protective equipment, waste management) and storage (premises, secured cupboards, type of recipients or containers) of chemical products. Each unit is responsible for the implementation of these terms in the laboratory, depending on:

- The degree of hazardousness
- The infrastructure in place
- The storage capacities
- The disposal capacities

The DSE-OHS support the head of unit in this mission. It regularly monitors the laboratories and will check that the regulations for usage and storage have been adhered to correctly.

Each unit must create an inventory of the chemical products used or in storage. These products must be clearly identified (eg. label and hazard pictograms)⁸. Their properties and characteristics must be known to their users. The safety data sheet (SDS, or fiche de sécurité – FDS in French) is the reference document for pure products. It must be kept available for as long as the product is in use or in storage. The user of the chemical substance must be particularly attentive to possible incompatibilities with other products present in the laboratory, in the storage area or at the time of disposal. The SDS must also specify the personal protective equipment required for the manipulation of each chemical substance.

The use of certain chemical products is subject to authorisation⁹. The School has created a list of substances which are particularly problematic¹⁰ and which can be ordered only after an analysis of the necessity and the risks¹¹ by the DSE-OHS.

4.3.2 Nanoparticles

The EPFL internal Directive “Exposure levels and control measures for nanomaterials” sets out the terms of use and the precautionary measures associated with the manipulations of nanomaterials¹².

⁷ http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/1.5.4_dir_gestion_organismes_fr.pdf

⁸ <http://scc.epfl.ch/hazards>

⁹ See paragraphe “Chemical Substances subject to an authorization” at <http://scc.epfl.ch/chemical-hazards>

¹⁰ <http://scc.epfl.ch/files/content/sites/sbst/files/shared/Documentation/Substances%20soumises%20%C3%A0%20autorisation.pdf>

¹¹ <http://scc.epfl.ch/files/content/sites/sbst/files/shared/Formulaire%20Demande%20autorisation.pdf>

¹² <http://www.particleandfibretoxicology.com/content/7/1/40>

The head of unit (or the COSEC, by means of delegation) will create an inventory of materials, powders or fibres in nanoparticle form used by his/her unit and will establish their classification according to the official EPFL plan. He/She implements the recommended safety measures for the class of products used. The DSE-OHS provide assistance notably for the analysis of risks, for the selection of safety equipment and for waste management.

4.4 Combined use of biological material and chemical substances

The combination of biological and chemical hazards may result in an increased risk for the staff members of the unit or immediate surroundings. It is the unit's responsibility to anticipate these risks and to introduce an evaluation procedure. The DSE-OHS and the EPFL Biosafety team provide support in the evaluation of the level of risk produced by the combination of various types of hazards.

4.5 Storage

4.5.1 Storage of chemical products

The storage of chemical substances must be organised in such a way as to:

1. Protect staff (clear work area, dedicated ventilation, controlled access, etc.) [Toxic > Harmful to health > Corrosive > Irritant > Harmful to the environment]
2. Protect material and infrastructures (E90 ventilated cupboards, anticorrosion piping, secured cabinet for gases, extinction system, etc.).
[Explosive > Flammable > Combustible > Corrosive > Pressurised gas]

Users are responsible for identifying possible incompatibilities between stored products and separating them accordingly. Storage regulations are available on the DSE website^{13, 14, 15}. It should be noted that retention containers must systematically be used for products bearing a hazard pictogram.

4.5.2 Storage of genetically modified or potentially pathogenic biological material

Likewise, the storage of biological material must:

1. Protect staff
2. Protect the environment

These two objectives are achieved by limiting the storage of biological material to confined areas or by using closed enclosures with controlled access (eg. Freezers at -20°C or -70°C, refrigerated cabinets).

Biological material, whether genetically modified or not, **from risk group 1** is not subject to specific storage regulations.

Biological material belonging to **risk group 2** must generally be stored in refrigerators or freezers in a Biosafety Level 2 laboratory (BSL2 or P2). Eppendorf tubes must be contained in plastic or cardboard boxes and clearly labelled. Ideally, these boxes will be secured with parafilm or by adhesive tape. Falcon tubes, Petri dishes or cultures in flasks or bottles must be contained in easily sealable boxes or plastic bags. Biological material from risk group 2 may be stored outside of a P2 laboratory, but the place in which they are stored (refrigerator, freezer) must be labelled with the "Biohazard" pictogram.

Biological material from **risk group 3** must always be stored in a P3 laboratory. As for the organisms in group 2, the material must be double packed.

¹³ <https://www.epfl.ch/about/overview/regulations-and-guidelines/polylex-en/polylex-search/> (select subsection "security").

¹⁴ http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/1.5.7_dir_stockage_inflammables_dans_locaux_fr1.pdf

¹⁵ http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/1.5.6_dir_stockage_cylindres_gaz_fr.pdf

4.6 Biological material and ionising radiation

EPFL must ensure that radioactive sources or ionising radiation generating equipment are used in accordance with federal legislation^{16, 17} and with the current applicable directives. The School entrusts to Experts in radioprotection from the “EPFL Radioprotection” team the supervision of authorisation requests¹⁸, user training, waste management, dosimetric monitoring and the checking of protection methods. The “EPFL Radioprotection” team work in collaboration with the Institut de radiophysique appliquée (IRA) and the Radiation Protection Division of the Federal Office of Public Health (FOPH) to complete the missions assigned to them.

Staff who are exposed to ionising radiation in their professional capacity must be announced to the EPFL Health Point who will authorise them to manipulate radioactive material or to operate closed radioactive sources or X-ray generators. Staff will be subject to specific dosimetric measurements relating to the level of their exposure: measure of committed dose (urine count, thyroid measurement) or measurement of exposure (thermo-luminescent badges –[dosimeters]).

The EPFL Biosafety team and the EPFL Radioprotection team work together closely in order to estimate the risk produced from the tagging of potentially pathogenic organisms or of laboratory animals with radioactive isotopes. In particular, these two teams must provide rulings on the confinement of experiments, the inactivation of organisms and waste management.

4.7 Transport of potentially dangerous material (chemical or biological)

4.7.1 Transport inside the building

The DSE will establish directives and guidelines regarding the transport of dangerous materials within EPFL. Specific regulations for the transport of genetically modified and/or potentially infectious/pathogenic organisms are established by the “EPFL Biosecurity” team.

The heads of unit (or their COSECs, by means of delegation) are responsible for the application of these rules. They ensure in particular that passage ways are kept free (no immobile furniture and minimum of 1.20 metres in width) and the provision of suitable transportation material, particularly for the transporting of chemical or biological liquids or for the transporting of organisms from risk group 2. It is prohibited to transport potentially hazardous chemical or biological material about one’s person. Transport boxes, buckets, drums or trolleys must be used for transporting material between different laboratories, for changing floor and for taking the lift. Likewise, a protective glove must not be worn on the hand used for opening doors or calling for the lift.

For the transporting of organisms from risk group 2, packaging must be able to resist a 1m drop without opening or breaking, thereby preventing the effusion of hazardous biological liquids or materials. The “Biohazard” pictogram must be visible on the packaging.

4.7.2 Transport on campus¹⁹

The principles listed above remain the same, with the following additional restrictions: no spillage in the environment must be possible in the case of an accident and genetically modified biological material from risk group 1 must also be double packed. Biological material from risk group 3 must be triple packed.

¹⁶ Radiological Protection Act (<https://www.admin.ch/opc/en/classified-compilation/19910045/index.html>)

¹⁷ Radiological Protection Ordinance (<https://www.admin.ch/opc/en/classified-compilation/19940157/index.html>)

¹⁸ Federal Office of public health – Surveillance and authorization (<https://www.bag.admin.ch/bag/fr/home/gesetze-und-bewilligungen/gesuche-bewilligungen/bewilligungen-aufsicht-im-strahlenschutz.html>)

¹⁹ By campus, is understood all of the EPFL buildings on the Ecublens, Neuchâtel, Geneva, Sion and Fribourg sites, as well as the streets and pathways connecting these buildings. On the Ecublens site, the large connecting streets such as Avenue du Tir Fédéral, Route de la Sorge, Avenue Auguste Forel and the Route Cantonale are excluded as they are considered public.

4.7.3 Transport on public roads

As for chemical products labelled with a hazard pictogram, organisms in risk group 2 are considered as hazardous goods for which the transport on public roads is subject to regulations. The role of safety advisor to the EPFL for the transport of hazardous goods (CST) is assumed by the DSE-OHS. The DSPS-SCC advises the CST regarding questions linked to the hazardousness of chemical products, while the “EPFL Biosafety” team is competent for answering questions concerning the transport of pathogenic organisms. Through verifications, the DSE-OHS and the “EPFL Biosafety” team ensure that transport guidelines are respected.

4.8 Potentially hazardous waste

With the support and expertise of DSE specialists and the “EPFL Biosafety” team, the Caretaker group (DSE-INT) is responsible for the disposal of waste produced by EPFL. It organises the storage, collection and transport of waste. In principle, the regulations for the disposal of biological waste are established by the “EPFL Biosafety” team and those concerning chemical waste by the DSE-OHS. The “EPFL Radioprotection” team is responsible for the management of radioactive waste.

The Schools are responsible for the separation and stocking of special waste until the DSE-INT takes over or until special disposal. They establish internal guidelines for waste management (which will depend on the type and volume of the waste and the specific risks associated) and make these guidelines available in the required adapted premises.

4.8.1 Chemical waste

The producer of chemical waste is responsible for their waste until the end of the recycling or destruction process. He/She must separate the waste according to its physical-chemical and toxic properties. Dilution prior to disposal is unauthorised unless for security reasons. With the exception of autoreactive or unstable waste, which must be deactivated in the laboratory in which it was produced, all special waste, if it has been correctly conditioned, is collected by the School shops; they alone are authorised to transfer the waste to external companies. All chemical waste is identified via a label indicating the name of the product (if it is a pure product), or the type of products (if it is a mixture: eg. Halogenated solvents, mineral oil). The main hazards must be indicated using the official GHS pictograms. The label must also include the name of the deliverer and the OMoD code²⁰ attributed to waste.

If possible, pure products are to be disposed of in their original packaging.

4.8.2 Biological waste

4.8.2.1 Genetically modified organism waste – risk group 1

According to ContainO, genetically modified organisms from risk group 1 must be disposed of safely. The risk analysis will help to decide the most suitable method of inactivation from either autoclaving, incineration offsite, freezing or chemical treatment. As a basic rule, solid waste is collected in adapted packaging of type UN 3245 which will be carried by special transport to the Tridel incineration factory for immediate incineration. Liquid waste is treated with a chemical decontaminant such as Virkon or bleach. The treated liquid is then disposed of as chemical waste²¹. Waste from cultures on agar is generally autoclaved in sealed containers and then disposed of as biomedical waste. Each inactivation method for waste must receive validation.

4.8.2.2 Biological material waste – risk group 2 and above

In principle, all biological waste, whether solid or liquid, with biological activity of class 2 or above, is to be destroyed by autoclave. However, based on a risk analysis, liquid waste may sometimes be

²⁰ <https://www.admin.ch/opc/fr/classified-compilation/20021081/index.html#app1>

²¹ Code OMoD 18 01 02

inactivated through chemical treatment. Solid waste destroyed by autoclave must be disposed of with biomedical waste. Liquid waste that has been inactivated by chemical treatment must be eliminated according to a procedure specific to the chemical products. Likewise, waste from cultures containing dangerous chemical products which are not destroyed by autoclaving (cytostatic, toxic bacteria, non-thermolabile antibiotics, etc.) is disposed of as chemical waste, even after autoclaving.

5 Infrastructures and equipment

5.1 Premises

The School defines the infrastructures that it requires and entrusts to the Development & Construction Department (VPO-DC) the installation and maintenance of the premises necessary for the correct functioning of an institute for research and teaching. In collaboration with the DSE, the School establishes the set of specifications for the special premises, taking into account practical safety measures (technical, operational and organisational) and defines the conditions for access. For “Bio” activities, the minimum requirements for safety measures in the laboratory are determined in annexe 3 of OPTM²² and annexe 4 of ContainO²³. OPTM may request additional measures if the protection of staff members so requires.

The “EPFL Biosafety” team participates in the planning and installation of laboratories of biological security levels 2 (BSL2 or P2) and 3 (BSL3 or 3). For level 3, the team creates the environmental impact assessment dossier in accordance with MAO and justifies it before the Direction Générale de l’Environnement (DGE) of the Canton of Vaud. The “EPFL Biosafety” team verifies the conformity of P2 and P3 installations to OPTM and ContainO criteria prior to the beginning of use. The “EPFL Biosafety” team participates in the presentation of premises at the end of construction and will be involved in all modification projects and technical interventions.

5.2 Fixed installations

The DSE-EXPL is responsible for the implementation, correct functioning and maintenance of technical installations, including all electrical installations, which form an integral part of the building (chemical storage cabinets, chemical hoods or ventilation systems for laboratories are typically fixed technical installations, for example).

The DSE-EXPL control the certificates for conformity and the quality of installations and validates their entry into service. It is also responsible for the maintenance and correct functioning of these installations. All interventions on a fixed installation in a P2 or P3 structure may be carried out only after receiving validation from the “EPFL Biosafety” team.

Users have the duty to inform the DSE-EXPL immediately if an installation is not functioning correctly.

5.3 Instruments and devices belonging to units

The head of unit (or the COSEC, by means of delegation) is responsible for verifying the conformity and the quality of working equipment when it is acquired. In particular, he/she must ensure that the declaration of conformity and the instruction manual for machines are available. He/she must organise a maintenance plan and regular checks on the state and functioning of the equipment. If necessary, he/she will organise the restoration or replacement of equipment. According to the School’s operating methods, this task may be delegated to the School’s technical service.

Users are obliged to inform the head of unit (or the School’s technical service) immediately of the incorrect functioning of an instrument.

²² <https://www.admin.ch/opc/fr/classified-compilation/19994946/index.html>

²³ http://www.admin.ch/ch/f/rs/c814_912.html

As part of its mandate for the monitoring of P2 and P3 infrastructures, the “EPFL Biosafety” team verifies the correct functioning of equipment which could create a microbiological risk for the user, in particular microbiological safety posts and all aerosol-generating devices.

5.4 Personal Protective Equipment (PPE)

The head of unit (or COSEC, by means of delegation) must ensure that the personal protective equipment (PPE) required for the activities of his/her laboratories is available and in use. This material must conform to the current applicable standards and correspond to the minimum standard implemented by the EPFL or by the Schools.

For chemical dangers, the PPE described in the SDS is correct. For physical dangers, the protective equipment advised by the supplier of a device or an installation is the point of reference. In both cases, the DSE may demand the adaption of PPE, in particular for situations in which the user will be faced with several types of hazard. The DSE also provides safety material and advice on the most suitable forms of protection.

For biological activities, standard PPR consists of a cotton laboratory coat with long sleeves which can be closed at the front and a pair of gloves corresponding to EN374-2 and EN374-3 standards. For the handling of potentially infectious liquids, it is obligatory to wear safety glasses/goggles. For activities from class 2 or above, adaptations to this standard equipment may be required, such as wearing a class FFP2 or FFP3 protective mask for activities in class 2 which cannot be carried out within a security cabinet, or for any class 3 activity. A Tyvek protective suit, shoe protections, hair net and double pair of gloves complete the list of minimal equipment for class 3 activities.

The “EPFL Biosafety” team validate all protective equipment required for experiments using biological material from risk group 3 or for any activity taking place in an BSL 3 laboratory.

5.5 Surveillance of lone workers

At EPFL, the term ‘lone worker’ is used to refer to an individual who works in a confined area (windowless room or corridor, restricted access premises, etc.). Access to these zones is achieved through mutual surveillance (buddy system, minimum two persons) or surveillance at distance (man-down system or DATI).

P2 and P3 laboratories are confined spaces with restricted access. Those working alone at night or on the weekend must thus obligatorily wear the DATI alarm device. Likewise, if the confined area in which a lone worker is operating during the day is located far away from the area in which his/her other colleagues are working, the DATI alarm device must obligatorily be worn.

5.6 Door safety data sheets

The ‘ISIDOR’ door safety data sheet generator enables the editing of a sheet describing the three most important hazards for each premise, as well as the obligations and restrictions relating to the activities carried out there. The door safety data sheets include the head of premises (generally the COSEC and/or BSO) and the contact persons in case of emergency intervention.

The door safety data sheet is created by the COSEC and/or BSO in charge of the premises. The sheet must be updated once per year or each time the activities carried out in the laboratory are modified.

For P2 and P3 laboratories, the door safety data sheet must obligatorily include the biosafety level, the “Biohazard” pictogram with a list of the main organisms handled, as well as the necessary PPE.

6 Basic regulations for working in a biological laboratory

The “EPFL Biosafety” team edits the basic regulations for working in a P2 or P3 laboratory based on current applicable legal texts and existing directives.

These regulations must be integrated, and if necessary completed, depending on the specific activities of the laboratory concerned. In principle, they are integrated into the safety concept for each research unit.

6.1 Unit safety concept

Units prepare their own safety concept. This is based on the general regulations edited by the « EPFL Biosafety” team, but includes the risks arising from the activities specific to their own laboratory. The head of unit or the COSEC must be able to present the unit’s safety concept during inspections or internal or external audits.

The safety concept must include:

- The description of methods and procedures specific to the laboratory with the related safety measures;
- The terms of use for the equipment in the premises;
- The training concept for new team members;
- The management principles for the hazardous substances and microorganisms used by the unit.

The safety concept serves as a basis for the risk analysis which must accompany any notification or request for activities involving genetically modified or potentially pathogenic materials.

6.2 Medical surveillance

The head of unit, with the support of the DSE-OHS, the EPFL Health Point and the “EPFL Biosafety” team, must ensure that all medical measures which could result from the activities carried out in his/her unit are taken. He/she must inform his/her staff of the specific medical measures (such as vaccination or screening) relating to the following activities: manipulation of organisms or biological materials belonging to risk group 2 or above; production or use of nanoparticles; exposure to lead or arsenic; exposure to ticks from areas in which the Far Eastern Tick-borne encephalitis virus is present.

He/She must also inform all female staff members of specific risks for pregnancy associated with the work in the laboratory, particularly those risks resulting from the use of potentially infectious or pathogenic microorganisms or exposure to CMRs. An OProMa visit will be carried out by the DSE-OHS in order to establish the eventual conditions for continuing activity in the workplace.

The head of unit may request that the Health Point and the DSE-OHS conduct an evaluation of work place exposure. He/She will ask his/her staff to register with the EPFL Health Point using a Professional Exposure Questionnaire²⁴.

Staff members exposed to biological risks will be summoned for a medical assessment by the EPFL Occupational Health team (Health Point).

6.3 Safety training

The DSE organises basic safety training (FOBS)²⁵. All EPFL staff members must follow at least the FOBS 1 course: fighting fire, first aid and occupational hygiene. Staff working in laboratories must also follow the FOBS 2 course: risks and hazards in the laboratory, safety elements, management of chemicals, waste management. The level 3 FOBS look at specific themes in more detail: (i) Biological risks; (ii) Working with lasers; and (iii) Working with nanoparticles.

All those who must have access to a P2 or P3 laboratory must obligatorily follow FOBS 3 – Biological risks. Without this training, CAMIPRO access rights will be denied.

²⁴ <http://securite.epfl.ch/occupationalmedicine>

²⁵ <http://securite.epfl.ch/coursetraining>

COSECS have the possibility of following the COSEC Training validated by SUVA. If a COSEC also fulfils the role of BSO, his/her hierarchic superior will ensure that he/she has received sufficient training in relation to biological risks²⁶.

The COSEC is responsible for introducing new staff members to the unit's activities and the specific risks/hazards associated. He/She trains users who must access the special premises (with restricted access) for which he/she is responsible and for which his/her signature authorises access.

7 Emergencies

The DSE-SIS handles all aspects of emergencies on campus. It implements 24/7 emergency intervention teams and organises the training of those involved. In particular, those involved in these teams are trained by the "EPFL Biosafety" team to handle the biological risks on campus.

All emergencies are coordinated by the alarm monitoring and operations centres (CAE) for which the telephone number is 115 (021 693 30 00 for external telephones).

The "EPFL Biosafety" team and the Occupation Health team must be informed of all biological accidents. Emergencies involving a high risk of infection are handled by the DSE-SIS for evacuation to the CHUV emergency department.

Finally, the DSE is to be informed of all accident or incident via the "Event manager" portal on the website: <http://scc.epfl.ch/> .

8 Inspections and checks

The head of unit is responsible for the safety of the members of his/her group. He/she must also ensure the safety of external visitors and the protection of the environment in relation to the substances (chemical, biological, nanoparticulate, etc.) used within the context of his/her research activities. Due to his/her responsibility and his/her hierarchical power, it is his/her duty to carry out checks within his/her unit. The COSEC assists in this task. The head of unit may refer to the DSE for safety standards to be checked during inspections.

EPFL bears the overall responsibility for the health and safety of those present on campus. The School entrusts the DSE with the responsibility of regularly inspecting the safety installations and of checking that safety regulations are followed by users. The DSE is in charge of inspecting laboratories, services and technological platforms and ensuring that any corrections requested have been made. The result of these inspections is recorded in the "Laboratory hazard directory" (LHD) which enables the surveillance of hazards and the monitoring of measures to be introduced.

The "EPFL Biosafety" team has the duty to carry out specific inspections in the units working with genetically modified or potentially pathogenic biological material. These inspections are coordinated with the DSE-OHS in order to avoid scheduling inspections too closely together. They must be announced at least one week in advance. During the inspection, the head of unit, the COSEC or one member of the unit must be present. The inspection report is transferred to the head of unit or to his/her COSEC and specifies the measures to be taken and timeframes accorded.

When necessary, the DSE may contact external regulatory bodies (SUVA, DGE, FOPH, EFBS, FOEN, FSVO, SECO, etc.) for planned or spontaneous external audits.

9 Rules for amendment

This document must be amended following structural reorganisation or when new biological risks not accounted for in this biosafety concept become present on the EPFL campus.

²⁶ <http://www.curriculum-biosafety.ch/index.php?id=17&L=1>

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13.04.2018	Version 1.2	Typographical corrections
15.03.2021	Version 1.3	Correction of service names