

Containment level 3 - Laboratory Facilities

Design features and technical characteristics

- The laboratory is physically separated from other activity areas in the same building or is located in a separated building.
- The entry into the laboratory occurs through an airlock.
- The first door of the airlock is lockable and controlled through an electronic system or equivalent.
- The doors of the airlock are provided with an automatic closing system. A particular mechanism is installed which prevents the doors of the airlock to be opened at the same time (e.g. by an interlocking system). This mechanism does not interfere with assistance in case of emergency.
- Windows are hermetically sealed.
- Rooms are sealable to allow decontamination with a gaseous substance.
- Furniture is designed to facilitate room cleaning and decontamination as well as control program for rodents and insects.
- The laboratory contains an observation window or an equivalent system so that occupants can be seen from outside.
- The contained area has a hands-free or automatically operated sink for hand washing and decontamination. The sink is located in the airlock or near the room exit door.
- A first-aid shower may be located either in the laboratory or in the airlock.
- The personnel have access to a change room for protective clothing. Protective and street clothing cannot be in contact.
- The supply fluid conducts are provided with anti-reflux devices.
- Floor and bench tops are easy to clean, impervious to water and are resistant to acids, alkalis, organic solvents, and those disinfectants and chemicals used for decontamination.
- Backup power is provided in case of power failure.
- The laboratory has an automatic system for fire detection and alarm.
- The contained area has an interphone, a phone or any other system to communicate with outside.
- The work area is permanently held at a negative air pressure relative to the pressure of the adjacent areas in order to avoid any transfer of contamination from inside to outside.
- A manometer controls the relative negative air pressure. It is recommended an alarm system turn on in case of failure of the aeration system.
- When the supply air is not provided by a system independent of adjacent areas (dedicated system recommended), airtight back draft dampers or an HEPA filter are installed. When the exhaust air is not discharged by a system independent of adjacent areas (dedicated system recommended), a second HEPA filter is installed in the exhaust system.
- Supply and exhaust air systems are interlocked to avoid a positive pressurization in case of accidental failure of the exhaust system.
- The supply and exhaust air systems can be sealed with dampers.
- Air is exhausted from the laboratory after filtration through an HEPA filter. This air cannot be recirculated within the building or within adjacent buildings or discharged near air intakes or near rooms with outside communication, unless a second HEPA filter is installed in the exhaust system.
- Changing HEPA filters occur after previous decontamination or in conditions that allow avoiding any contamination, and in accordance with the constructor instructions.
- Air conducts are designed to allow room decontamination with a gaseous substance.
- Ventilation system has an emergency power supply in case of general power failure.
- An appropriate renewal air rate allows ventilation of the controlled area in order to reduce at most air contamination.

Safety equipment

- The laboratory has at least one class II biological safety cabinet if open manipulations are performed. It is installed in order to avoid disturbing airflows equilibrium inside the work area. It is located away from doors, from windows, from room supply and exhaust air louvers, and from heavily travelled laboratory areas. It is controlled and certified when placed, after each moving and at least once a year.
- An autoclave, preferably a double-door one, is located in contained area.
- Biological material is centrifuged in centrifuges located in the contained area. It is placed in leak-proof tubes in rotors or cups with a hermetic closing system ("safety cups") to contain aerosols in case of breaking or cracks of tubes.
- Vacuum lines used for work are provided with HEPA filters.

Work practices and Waste disposal management

- Access to the laboratory is restricted to persons authorized by the responsible person and advised of the potential risks. An access control system is put in place.
- The room access door is labelled with the following information:
 - Biohazard symbol,
 - Containment level,
 - Coordinates of the responsible person for the area,
 - Nature of the biological risk,
 - The list of persons authorized to enter the area,
 - Requirements for entering the contained area.
- Dedicated equipment is assigned to the laboratory.
- Protective laboratory clothing is worn. Protective clothing is dedicated to the contained area and is not worn outside. It is decontaminated preferably in the contained area prior to laundering or elimination.
- Gloves are available for the personnel and worn when necessary.
- Outside manipulations, viable pathogens and/or genetically modified (micro)-organisms are contained within closed systems (tubes, flasks, etc.).
- The creation of splashes and the formation of aerosols are minimized. Their spreading is controlled by the use of appropriate equipment and practices.
- All manipulations likely to produce infectious aerosols or involving potential risks are conducted within a biological safety cabinet.
- Use of a horizontal airflow cabinet is prohibited for the manipulation of pathogens and/or genetically modified (micro)-organisms.
- Mechanical pipetting devices are used. Mouth pipetting is prohibited.
- Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human consumption are not permitted in the laboratory.
- All the manipulated and stored pathogens and/or genetically modified (micro)-organisms are recorded in a register.
- Control measures and control equipment as well as protective equipment are adequately and regularly tested.
- The workers wash their hands when they leave the contained area, before beginning another activity and each time it is proved necessary.
- Work surfaces are decontaminated with an appropriate disinfectant after work is finished and after any spill of biological material.
- Directions for use of disinfectants are available for the personnel. Depending on the purpose, instructions precise the kind of disinfectant to use, its concentration, and contact time.
- Instruction of the personnel on biosafety aspects is organized as well as a follow up and regular updates. The personnel are specifically trained to work in an area with containment level 3.
- A biosafety manual is prepared and adopted. Personnel are advised of special risks they are exposed to and are required to read instructions on work practice. Behaviour in case of accident is clearly posted in the laboratory.

- The biosafety symbol is posted on incubators, refrigerators, freezers, and liquid nitrogenous cryopreservators containing biological material with a class of risk 2 or higher.
- An efficient control program for rodents and insects is in effect.
- Animal spreading in the laboratory is forbidden.
- Management of wastes and/or residual biological material satisfies the following conditions:
 - Contaminated wastes and/or residual biological material and contaminated disposal are inactivated by an appropriate and validated method before disposal, e.g. by autoclaving or incineration. Incineration is performed in an agreed installation. Bags and containers used for infectious waste collect are resistant, sealable, labelled with the biosafety symbol and closed before leaving contained area.
 - Before washing, reuse and/or destruction, contaminated material (glassware, slides, etc.) is inactivated by an appropriate and validated means.
- Effluents from sinks and showers are preferably inactivated by an appropriate and validated means before final evacuation.