INTRODUCTION

Biological agents are microorganisms (fungi, bacteria, excretory products, viruses, cell cultures and endoparasites) which could have a harmful effect on organisms including human beings. If any changes have been made to the genetic material (DNA) of these organisms, these organisms will fall under the definition of genetically modified organisms (GMOs).

(Pathogenic) biological agents are classified into four categories based on infectiousness, possible therapy and consequences of the infection. Category 1 contains the least harmful and category 4 the most harmful biological agents (see Annex I). The classification of pathogenic biological agents can be found in European directives. These directives are periodically updated. The arrangements to be made in order to reduce or avoid the risks of exposure depend on the danger level. Cells also fall under the definition of biological agents. Cell line suppliers, therefore, use the above classes, depending on the pathogenic microorganisms that are or could be present in the cells.

GMOs are classified based on the activity with the modified organism ('small-scale' for educational, research and development purposes or non-small scale) and the origin of the modified organism (microorganism, plant, animal). The classification determines the administrative procedures to be followed.
The possible (harmful) consequences caused by the modified organism to the environment or health when released determine the containment level to be maintained when working with GMOs. Based on EU directive 98/81, the following containment levels can be distinguished:

- Microorganisms Laboratory scale ML-I;
- Microorganisms Laboratory scale ML-II;
- Microorganisms Laboratory scale ML-III;
- Microorganisms Laboratory scale ML-IV;

The rules and guidelines for the classification of the correct danger level have been issued by the Genetic Modification Committee (Commssie Genetische Modificatie, COGEM).

A biological safety officer (BVF) was appointed in order to supervise safe working with GMOs.

These regulations briefly discuss the procedures and requirements to be met within the University of Twenty (UT) when working with biological agents or GMOs. A detailed description has been included in the 2008 'Manual containing regulations on safe working with genetically modified organisms and biological agents by the University of Twente' (Handboek Voorschriften voor het veilig werken met genetisch gemodificeerde organismen en biologische agentia van de Universiteit Twente (2008)). A copy of this manual can be requested from the UT's BVF.

LEGISLATION/NECESSARY PERMITS

The rules on working with biological agents in the Working Conditions Decree and the Working Conditions Policy Rules are used primarily as protective measures for employee(s) and third parties against (pathogenic) microorganisms. Any activities with GMOs may only be carried out under certain preconditions arising from the Chemical Substances Act (Wet Milieugevaarlijke Stoffen) and the Environmental Management Act (Wet Milieubeheer).

Two permits are needed in order to work with GMOs: a permit under the Environmental Management Act and a GMO permit. The permit under the Environmental Management Act is aimed at licensing types and numbers of workplaces where working with GMOs is permitted, laying down set-up rules for these spaces. The GMO permit is aimed at prescribing general and specific safety requirements (e.g. work instructions) when carrying out activities with GMOs.

Based on the GMOs Decree, activities with GMOs are classified into:

- contained use (activities with GMOs in special facilities such as laboratories, research greenhouses, animal research facilities and processing facilities);
- introduction into the environment (activities other than contained use, such as field tests with GMOs and bringing products containing GMOs into the market).

For **contained use**, a notification must be made pursuant to the GMOs Decree in order to determine the work instructions. Before the activities can start, a permit under the Environmental Management Act must have been issued for the space(s) where the activities will be carried out. The competent authorities for this permit are the local authorities.

The assessment of these permit applications is aimed at determining the containment level and any additional regulations under which the activities may be carried out. Here, special attention is paid to the characteristics of the host, vector and donor sequences.

Introduction into the environment is also subject to an obligation to have a permit under the GMOs Decree.

In order to file notifications and applications for permits, various procedures and regulations apply and various forms are available.

More information about the procedures and forms can be obtained from the UT's biological safety officer (BVF).

It is necessary to apply for the permits at least 3 to 6 months before the activities will actually be carried out

In case of activities with pathogenic microorganisms, the Labour Inspectorate must be notified at least 30 days before the activities with biological agents of category 2, 3 or 4 are carried out for the first time.

In case of activities with genetically manipulated organisms, the Labour Inspectorate must be notified as well. The notification may be limited to a copy of the permit issued by the State Secretary for Infrastructure and the Environment.

IMPLEMENTATION AT THE UT

At the UT, the Executive Board has the final responsibility for health, safety and environment. This responsibility has been delegated to the faculty managers. Within a faculty, a manager has the following responsibilities with respect to activities with biological agents and GMOs:

- Organizational and financial management responsibility for these activities within his or her faculty;
- Providing staff capacity, time and means to allow the responsible employee (VM) to properly perform his or her job and for replacement should the VM be absent;
- installing necessary technical and structural facilities (remedying any defect thereto).

A VM is only appointed for activities with GMOs. The faculty's Health, Safety and Environment Coordinator is the first point of contact for activities with other biological agents. Apart from the permits required, it is necessary to perform a hazard identification and risk assessment (RI&E) before starting any activities with GMOs or biological agents.

PERFORMING AN RI&E

The assessment must focus on ***the hazard to the environment*** *as well as* ***the nature, extent and duration of the exposure*** of the employee(s).

The following should be taken into account:

I Information on the biological agent

- Classification of activities with GMOs/Risk category of the biological agent
  See the Regulations on GMOs and the pertaining COGEM guidelines (Dutch only) and Working Conditions information sheet no. 9 for an up-to-date classification of microorganisms into the various categories.
- Information on diseases
  Information about diseases which employees could contract or have already contracted as a result of exposure to biological agents.
- Information on symptoms of allergy and poisoning
  Possible symptoms of allergy or poisoning experienced by the employees as a result of exposure to biological agents.
- Other information
  The results of any medical research (this information must be processed such that it cannot be traced back to any individual).

II Characterization of activities/sources of infection

- What activities are carried out using the biological agents?
- What possible sources of infection can be pointed out?

III Employees exposed to biological agents

- Which employees could be exposed to the biological agent(s)? This includes employees who could be exposed indirectly (students, cleaning staff, transport or maintenance staff). If microorganisms of category 3 or higher are used, a register of employees working with these microorganisms should be present.
- Are there any at-risk groups who could be exposed (pregnant women, young persons, people with decreased resistance).

IV Measurements

- What measurements with respect to determining any infections of the spaces can be performed?
- Have any limit values been set?

V Action Plan

State which measures can be taken to prevent infection. The measures to be taken depend on the risk category of the biological agent(s). The compulsory containment level is important for activities with GMOs and pathogenic biological agents. Annex 2 contains the set-up requirements and work instructions per containment level for GMOs (ML-I, ML-II, ML-III and ML-IV). Annex 3 shows, for each category, the necessary facilities in laboratories for working with pathogenic microorganisms.

Attention should also be paid to the following topics:

- Internal/external transport of biological agents and GMOs: (Only in Dutch)
- Set-up of information and instructions on biological safety;
  - possible health hazards;
  - precautionary measures taken;
  - actions to be taken in case of an accident;
  - hygiene regulations;
  - the use of work clothes and personal protective equipment (PPE).

General work instructions have been included in Chapter 5 of the abridged manual for ML-I, ML-II laboratories (GMO) and/or laboratories for working with biological agents (human material).

- Medical check-up of employees working with biological agents. All employees are entitled to a medical check-up at the start of the activities, in case of a possible exposure to biological agents or if they or other employees have become ill. Employees who frequently work with human blood or human blood products must, in accordance with the Working Conditions Decree, be given the opportunity to be vaccinated against hepatitis B.

TECHNICAL AND ORGANIZATIONAL MEASURES

Waste

Contaminated waste should be removed in a responsible manner, i.e. the waste should be disinfected first and then removed or the waste should be removed in such a way that it is no longer hazardous. This means that a blue barrel for hospital waste should be used. These barrels have a lid that can be made airtight (see UT regulations on removal of industrial waste and hazardous waste).

Permit under the Environmental Management Act for working with genetically modified organisms

The UT has one environmental permit under the Environmental Management Act. The spaces where activities are carried out using GMOs fall under this permit. Depending on the nature of the activities and the space where the activities are carried out, the employee responsible for the research should contact the BVF for the purpose of applying for a modification permit. The application for a modification permit is sent to the municipal authorities through the Directorate for Human Resources (HR). The contents of the application for a modification permit are prepared in consultation with the employee responsible for the project.

Notification within the context of the Chemical Substances Act for working with genetically modified microorganisms

The form to apply for the notification for working with GMOs can be obtained from the BVF. The contents of the permit application are prepared by the employees responsible for the research and checked and sent to the ministry by the BVF. The applications are registered centrally. A new notification must be filed if any new GMOs are used.

Notification to the Labour Inspectorate

The notification for working with pathogenic microorganisms of category 2 and higher are sent to the labour inspectorate through HR. The contents of the notification are prepared by the research project leader and checked by the BVF. The contents of the notification are as follows:

- details of the employer (University and faculty/department where the activities are carried out);
- officer responsible for safety and the environment (biological safety officer);
- the results of the RI&E;
- category of the biological agents;
- proposed protective and preventive measures.

In case of activities with GMOs, the notification may be limited to a copy of the permit issued by the State Secretary for Infrastructure and the Environment. This notification, too, is sent by HR through the BVF.

LITERATURE/FURTHER INFORMATION

1. Working Conditions Information Sheet number 9: working with biological agents. Ministry of Social Affairs and Employment.
2. NVVM (2010) Safe working with microorganisms, parasites and cells in laboratories and other workplaces.
3. Biotechnology File (only in Dutch) of the Ministry of Infrastructure and the Environment (formerly the Ministry of Housing, Spatial Planning and the Environment)

ANNEX 1: CLASSIFICATION OF BIOLOGICAL AGENTS INTO CATEGORIES

Legislation (Working Conditions Decree, Article 4.84) uses the following classification of biological agents into categories:

- Category 1: an agent that is unlikely to cause any diseases in human beings.
- Category 2: an agent that could cause a disease in human beings and could pose a danger to employee safety and health, but which is unlikely to spread among the population, while an effective prophylaxis or treatment exists.
- Category 3: an agent that could cause serious diseases in human beings and could pose a significant danger to employee safety and health and which is likely to spread among the population, while a prophylaxis or treatment exists.
- Category 4: an agent that could cause serious diseases in human beings and poses a significant danger to employee safety and health and which is very likely to spread among the population, while no effective prophylaxis or treatment exists.

In the form of a diagram:

Category	Disease-producing ability	Chance of spreadingamong the population	Prophylaxis/treatment
1	very small	-	N/A
2	present	-	+
3	large	+	+
4	very large	+	-

ANNEX 2 : PHYSICAL CONTAINMENT, WORK INSTRUCTIONS AND PROCEDURES FOR ACTIVITIES IN LABORATORIES

(From the Regulations on genetically modified organisms (the Regulations) and the COGEM Guidelines to these regulations (the Guidelines).

1 Laboratories

1.1 The ML-I workplace

1.1.1 Set-up rules for ML-I space

a. The workplace is a permanent structure, the work surfaces, floors, walls and doors of which are finished with non-absorbing material, and the work surfaces of which are able to withstand water, acids, bases, solvents, disinfectants and disinfection reagents and can be cleaned easily;

b. The workplace is entered through a door which:

1. shows that it is an ML-I space;
2. shows the names and telephone numbers of at least one person responsible for the space and of the biological safety officer;

Equipment

c. The location has an autoclave;

d. The workplace has a washbasin and a soap dispenser;

e. The workplace has separate hooks for work clothes;

Other

f. Appliances are in sound condition.

1.1.2 Work instructions for ML-I

General

a. The workplace is kept clean and tidy;

b. Eating, drinking, smoking, having cutlery or mugs, applying cosmetics and storing food and drinks in the workplace are forbidden;

c. Mouth pipetting is forbidden;

d. There should be no vermin;

e. After the written permission of the biological safety officer, the workplace may be used for activities with non-genetically modified organisms if the workplace is not use for activities with genetically modified organisms. This is shown on the entrance door. The relevant employees will be informed of this in advance;

f. Any infected surfaces will be disinfected immediately after infection;

g. Clothing infected by spillage or accidents with genetically modified organisms will be sterilized or disinfected before washing;

h. Personal belongings including any unworn clothes are stored outside the workplace;

During activities

i. During the activities, the doors and windows of the workplace are closed;

j. The production and spreading of aerosols are avoided during all activities;

k. Suitable protective clothing is worn. This clothing will, after the activities, be left behind in the workplace;

after activities

l. The work surfaces are disinfected at the end of the activities and at the end of each working day;

m. When leaving the workplace, employees should wash their hands with soap;

waste and contaminated material

n. All biological waste is collected in shatterproof, leakproof and lockable containers, and is inactivated before being discarded;

o. Any materials that have been in contact with genetically modified organisms are inactivated or disinfected before they are washed, reused or removed as waste;

other

p. If a bioreactor is used:

1. its effective contents may not exceed 100 litres;
2. the bioreactor must be built in such a way as to limit the spreading of genetically modified organisms;
3. sampling the bioreactor, adding materials to the bioreactor and transferring materials to another system must be done in such a way as to avoid the production and/or spreading of aerosols and infection of external surfaces;
4. the contents of the bioreactor may be discharged only after any genetically modified organisms present have been inactivated using a validated method;

q. In case of simultaneous activities with non-genetically modified organisms, the ML-I work instructions must be observed;

r. Plants and animals, modified and unmodified, and not forming part of an experiment may not be present in the workplace.

1.2 The ML-II workplace

1.2.1 Set-up rules for ML-II

space

a. The workplace is a permanent structure, the work surfaces, floors, walls and doors of which are finished with non-absorbing material, and the work surfaces of which are able to withstand water, acids, bases, solvents, disinfectants and disinfection reagents and can be kept clean easily;

b. The workplace is entered through a lockable door which:

1. shows that it concerns an ML-II space;
2. shows the biohazard sign; and
3. shows the names and telephone numbers of at least one person responsible for the space and of the biological safety officer;

c. Windows in the workplace cannot be opened;

Rquipment

d. An autoclave is present inside the building;

e. There is a washbasin and a soap dispenser near the exit of the workplace, whereby it is possible to operate both the washbasin tap and the soap dispenser without using one's hands;

f. The workplace has separate hooks for work clothes;

g. The workplace has a class-II safety cabinet;

Other

h. Appliances are in sound condition.

1.2.2 Work instructions for ML-II

General

a. The workplace is kept clean and tidy;

b. Eating, drinking, smoking, having cutlery or mugs, applying cosmetics and storing food and drinks in the workplace are forbidden;

c. Mouth pipetting is forbidden;

d. There should be no vermin;

e. The door to the workplace is locked if no employees are present in the workplace;

f. Unauthorized persons are not allowed to enter the workplace;

g. Work clothes are disinfected or sterilized before they are washed;

h. Personal belongings including any unworn clothes are stored outside the workplace;

i. After the written permission of the biological safety officer, the workplace may be used only for ML-I activities according to the instructions referred to under 1.1 or only for activities with non-genetically modified organisms. This is shown on the entrance door. The relevant employees will be informed of this in advance;

j. Any infected surfaces will be disinfected immediately after infection;

During activities

k. During the activities, the doors of the workplace are closed;

l. Any activities possibly producing aerosols are carried out in a class-II safety cabinet;

m. Wearing wrist watches and jewellery on arms and hands is forbidden;

n. Suitable protective clothing is worn. This clothing will, after the activities, be left behind in the workplace;

After activities

o. The work table tops are disinfected at the end of the activities and at the end of each working day;

p. When leaving the workplace, employees should wash their hands with soap;

Waste and contaminated material

q. All biological waste is collected in shatterproof, leakproof and lockable containers, and is inactivated before being discarded;

r. Any materials that have been in contact with genetically modified organisms are inactivated or disinfected before they are washed, reused or removed as waste;

Other

s. Animals and plants, modified and unmodified, and not forming part of an experiment may not be present in the workplace;

t. It is forbidden to keep animals and plants inside the workplace;

u. If a bioreactor is used:

1. its effective contents may not exceed 100 litres, and the exhaust air pipe of the bioreactor has a hydrophobic absolute filter, or a comparable facility;
2. the bioreactor must be built in such a way as to strongly limit the spreading of genetically modified organisms;
3. sampling the bioreactor, adding materials to the bioreactor and transferring materials to another system must be done in such a way as to avoid the production or spreading of aerosols and infection of external surfaces;
4. the contents of the bioreactor may only be discharged after any genetically modified organisms present have been inactivated using a validated method;

v. All activities with animals and plants are carried out in a class-II safety cabinet;

w. Gloves must be worn if activities with animals are carried out;

x. In case of simultaneous activities with genetically modified organisms classified at ML-I level or activities with non-genetically modified organisms, the ML-II work instructions must be observed.

1.3 The ML-III workplace

1.3.1 Set-up rules for ML-III

Space

a. The workplace is a permanent structure, the work surfaces, floors, walls and doors of which are finished with non-absorbing material, and the work surfaces, walls and doors of which are able to withstand water, acids, bases, solvents, disinfectants and disinfection agents and can be cleaned easily;

b. The workplace has a two-door lockable airlock. The two doors may not be opened simultaneously;

c. The airlock is entered through a door which:

1. shows that it concerns an ML-III space;
2. shows the biohazard sign; and
3. shows the names and telephone numbers of at least one person responsible for the space and of the biological safety officer;

d. The windows in the workplace have been sealed and cannot be opened;

e. The floor is liquid-tight;

f. The laboratory has been built such as to allow for disinfection using gases;

g. There is a ventilation system that allows for underpressure of the workplace compared with the prevailing atmospheric pressure. The exhaust air system is an independent channel with an HEPA filter;

h. Vacuum pipes have a hydrophobic absolute filter or comparable facility;

Equipment

i. There is an en suite autoclave**;**

j. The airlock has a washbasin and soap dispenser, whereby it is possible to operate both the washbasin tap and the soap dispenser without using one's hands;

k. The airlock has hooks for work clothes;

l. The workplace has a class-II safety cabinet;

Other

m. Appliances are in sound condition.

1.3.2 Work instructions for ML-III

General

a. The workplace is kept clean and tidy;

b. Eating, drinking, smoking, having cutlery or mugs, applying cosmetics and storing food and drinks in the workplace are forbidden;

c. Mouth pipetting is forbidden;

d. There should be no vermin;

e. The door to the workplace is locked if no employees are present in the workplace;

f. Only employees immediately involved in the activities have access to the workplaces; others are only allowed to enter the workplaces with the separate written permission of the biological safety officer;

g. Work clothes are disinfected or sterilized before they are washed;

h. After the written permission of the biological safety officer, the workplace may, for a period of at least one month, be used only for ML-II activities according to the instructions referred to under 1.2. The relevant period is shown on the entrance door and the relevant employees have been informed of this in advance;

i. Any infected surfaces will be disinfected immediately after infection;

During activities

j. During the activities, the doors of the workplace are closed;

k. Any activities possibly producing aerosols are carried out in a class-II safety cabinet;

l. Wearing wrist watches and jewellery on arms and hands is forbidden;

m. Suitable protective clothing is worn. This clothing will, after the activities, be left behind at the infected side of the airlock. Personal belongings and clothes not worn under the work clothes are left behind at the non-infected side;

n. Gloves must be worn during the activities;

After activities

o. The work surfaces are disinfected at the end of the activities and at the end of each working day;

p. Employees should wash their hands with soap before leaving the contained area;

Waste and contaminated material

q. All biological waste is collected in shatterproof, leakproof and lockable containers or similar packing, and is inactivated before being discarded;

r. Any materials that have been in contact with genetically modified organisms are inactivated or disinfected before they are washed, reused or removed as waste;

Other

s. Animals and plants, modified and unmodified, and not forming part of an experiment may not be present in the workplace;

t. It is forbidden to keep animals and plants inside the workplace;

u. All activities with animals and plants are carried out in a class-II safety cabinet;

v. In case of simultaneous activities with genetically modified organisms classified at ML-II or ML-I level or activities with non-genetically modified organisms, the ML-III work instructions must be observed.

1.4 The ML-IV workplace

1.4.1 Set-up rules for ML-IV

Space

a. The workplace is a permanent structure, the work surfaces, floors, walls, doors and ceilings of which are finished with non-absorbing material, and the work surfaces, floors, walls, doors and ceilings of which are able to withstand water, acids, bases, solvents, disinfectants and disinfection agents and can be cleaned easily;

b. The workplace has a lockable airlock;

c. The airlock has a shower, which, as the only passageway, is located between a clean and a contained changing room. The clean and contained space are connected by means of two interlocking doors;

d. The airlock is entered through a door which:

1. shows that it is an ML-IV space;
2. shows the biohazard sign; and
3. shows the names and telephone numbers of at least one person responsible for the space and of the biological safety officer;

e. The windows in the workplace have been sealed and cannot be opened;

f. The floor is liquid-tight;

g. The laboratory has been built such as to allow for disinfection using gases;

h. There is a ventilation system that allows for underpressure of the workplace compared with the airlock and of the airlock compared with the prevailing atmospheric pressure. The supply and exhaust air system has a HEPA filter. The filters are disinfected on-site when replaced;

i. Vacuum pipes have a hydrophobic absolute filter or comparable facility. The filters are disinfected on-site when replaced; October 2003 48

j. The laboratory may not be located in the vicinity of spaces with a risk of fire or explosion or at locations where there is a chance of flooding;

k. Each door frame has a doorstep of at least two centimetres high. The doorsteps are jointless and have no big differences;

l. All taps in the workplace can be operated without using one's hands;

m. Water pipes are disconnected from the water pipes outside the workplace or have one-way valves;

n. Facilities have been installed for disinfecting all waste water including washbasin and shower waste water;

o. The ventilation systems, door interlock systems and the shower and double-ended autoclave, the safety cabinets, emergency lighting and detection systems are connected to an emergency power system, such as to ensure a continuous proper functioning of the systems;

p. Visual contact with employees in the workplace is possible;

q. The ventilation system is protected against air flow reversal and has an alarm system that generates a warning if the ventilation system is malfunctioning;

r. The underpressure in the workplace is measured; the measuring equipment can be read both from within and outside the workplace;

Equipment

s. There is a double-ended autoclave between the contained and non-contained area, of which the door at the non-contained side can only be opened after a full sterilization cycle;

t. The contained workplace has a washbasin and soap dispenser. Both the tap of the washbasin and the soap dispenser can be operated without using one's hands;

u. The infected side of the airlock has a container for used work clothes;

v. The workplace has a class-II safety cabinet;

w. The workplace has a telephone or fax or similar facility for communication with the outside world;

Other

x. Appliances are in sound condition.

1.4.2 Work instructions for ML-IV

General

a. The workplace is kept clean and tidy;

b. Eating, drinking, smoking, having cutlery or mugs, applying cosmetics and storing food and drinks in the workplace are forbidden;

c. Mouth pipetting is forbidden;

d. There should be no vermin;

e. The door to the workplace is locked if no employees are present in the workplace;

f. Only employees immediately involved in the activities have access to the workplaces; others are only allowed to enter the workplaces with the separate written permission of the biological safety officer;

g. Work clothes are sterilized after use;

h. After the biological safety officer has given his written permission after disinfection of the ML-IV workplace, the workplace may, for a period of at least one month, be used exclusively for ML-III activities according to the instructions referred to under 1.3. The applicable period is shown on the entrance door and the relevant employees have been informed of this in advance. When the space is put into use again as ML-IV workplace, the workplace and the instruments will be disinfected again and the biological safety officer has to give his permission again. The entrance door shows the use as ML-IV workplace;

i. A full change of clothes upon arrival and departure and showering upon departure are mandatory;

j. Work clothes include a lab coat, gown or overall, all in combination with boots or disposable shoes;

k. Any infected surfaces will be disinfected immediately after infection;

During activities

l. During the activities, the doors of the workplace are closed;

m. All activities with genetically modified organisms classified at ML-IV level are carried out in a class-III safety cabinet, an underpressure insulator or, in case of activities with animals who cannot be kept in an underpressure insulator, in a facility with comparable physical containment;

n. Wearing wrist watches and jewellery on arms and hands is forbidden;

o. Fully protective clothes and separate shoes must be worn. These clothes and shoes are left at the infected side of the airlock after completion of the activities. Personal belongings, personal clothes and shoes stay behind in the non-contaminated side of the airlock;

p. Gloves must be worn during the activities;

After activities

q. The work surfaces are disinfected at the end of the activities and at the end of each working day;

r. When leaving the workplace, employees should wash their hands with soap;

Waste and contaminated material

s. All biological waste is collected in shatterproof, leakproof and lockable containers, and is inactivated before being discarded;

t. Any materials that have been in contact with genetically modified organisms are inactivated or disinfected before they are washed, reused or removed as waste;

u. Waste water is infected according to a validated method before it is discarded;

Other

v. It is forbidden to remove materials from the workplace other than after sterilisation through the double-ended autoclave or validated immersion bath.

ANNEX 3: FACILITIES IN LABORATORIES FOR WORKING WITH PATHOGENS

Each category of biological agents require a certain laboratory containment level. The relevant requirements can be found in the Working Conditions Decree. These requirements are in addition to normal laboratory requirements as described in the Working Conditions Information Sheet (AI-18). The below table 3.1 shows the minimum facilities for each category of biological agents. No special requirements in connection with biological agents apply to category 1. The basic principle is safe microbiological work, with normal hygiene regulations and facilities (disinfection, water, soap, etc.) in place.

Table 3.1: Facilities in laboratories for working with pathogens

Note in advance

The measures contained in this Annex shall be applied according to the nature of the activities, the assessment of risks run by employees and the nature of the biological agent concerned.

A Containment measures	B Containment levels		
	2	3	4
1. The workplace is to be separated from any other activities in the same building	No	Recommended	Yes
2. Input air and extract air in the workplace are to be filtered using High Efficiency Particulate Air (HEPA) Filter or likewise	No	Yes, on extract air	Yes, on input and extract air
3. Access is to be restricted to authorized persons only	Recommended	Yes	Yes, via airlock
4. The workplace should be sealable in order to permit disinfection	No	Recommended	Yes
5. Specified disinfection procedures	Yes	Yes	Yes
6. The workplace is to be maintained at an air pressure negative to atmosphere	No	Recommended	Yes
7. Efficient vector control, e.g. rodents and insects	Recommended	Yes	Yes
8. Surfaces impervious to water and easy to clean	Yes, for bench	Yes, for bench and floor	Yes, for bench, walls, floor and ceiling
9. Surfaces resistant to acids, alkalis, solvents and disinfectants	Recommended	Yes	Yes
10. Safe storage of a biological agent	Yes	Yes	Yes, secure storage
11. An observation window, or, alternative, is to be present, so that occupants can be seen	Recommended	Recommended	Yes
12. A laboratory is to contain own equipment	No	Recommended	Yes
13. Infected material, including any animal, is to be handled in a safety cabinet or isolator or other suitable container	Where appropriate	Yes, where infection is by airborne route	Yes
14. Incinerator for disposal of animal carcasses	Recommended	Yes, available	Yes, on site