

Technological University Dublin – Tallaght Campus

## Ancillary Safety Statement

For



## Code of Safe and Ethical Conduct for the CASH - Synergy Research & Innovation Building

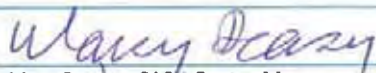
Revision 4.0

April 2019

| REVISION HISTORY |  |                |                           |  |  |
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| Rev.             | Reason for change  | Effective from | Prepared by & date        | Approved by & date                                     | Description of change  |
| 1.0              | First iteration  | March 2013     | K. Carroll<br>March 2013  |  |  |
| 1.1              | Edits to merge CASH and Synergy Safety Statements  | April 2013     | K. Carroll<br>March 2013  | K Carroll & T<br>Rooney, 26 <sup>th</sup> June<br>2013 | Edits to merge CASH and Synergy Safety Statements into a single document for the whole building  |
| 1.2              | Update list of fire wardens  | Oct. 2013      | K. Carroll<br>Oct. 2013   | K Carroll & T<br>Rooney, Oct.<br>2013                  | Update list of fire wardens  |
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| 2.0              | Update of emergency contact numbers p65-68<br>Update of risk management  | 13 May 2016    | K. Carroll<br>13May16     | K Carroll & T<br>Rooney, 13May16                       | Update of emergency contact numbers – remove names of persons who have left and add names of new persons<br>Addition of risk management statements for each area of activity (provided as a separate document)                                 |
| 3.0              | Inclusion of information on the new Class 2 Microbiology Laboratory and associated procedures<br>Update to Specialist equipment details and risk assessment information<br>General amendments on personnel and contact details | 20 March 2017  | M. Deasy<br>20 March 2017 | M. Deasy & T.<br>Rooney, 20 March 2017                 | Addition of Class 2 Microbiology Laboratory safety procedures & protocols<br>Removal of section on Raman Spectroscopy and inclusion of section on LC-MS<br>Change to Centre Manager details<br>Update phone extensions and fire warden details |
| 4.0              | Changes in text to reflect name change of IT Tallaght to TU Dublin   | 16 April 2019  | M. Deasy<br>16 April 2019 | M. Deasy<br>16 April 2019                              | Replace IT Tallaght with TU Dublin – Tallaght Campus and the change to Synergy Centre Manager details<br>Edits to CSSC membership details  |

Approved by:

Signature:

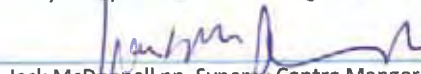


Mary Deasy - CASH Centre Manger

Date:

18/4/19

Signature:



Jack McDonnell pp. Synergy Centre Manger

Date:

18/4/19

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# Code of Safe and Ethical Conduct in the CASH-Synergy Research-Innovation Building

## Section A. Introduction

The purpose of the Safety, Health and Welfare at Work Act, 2005 is to lay down general safety, health and welfare principles for all places of work, to prevent accidents and ill health arising at work or from a work or workplace related activity. The Act applies to employers and employees in all types of work and embraces all the activities of the Institute of Technology, Tallaght.

The Act requires the employer to prepare a written Safety Statement describing the employer's arrangements and the employee co-operation necessary to provide a safe workplace.

In response to this requirement, TU Dublin – Tallaght Campus has prepared a Parent Safety Statement describing management's safety programme and employee co-operation. In recognition of the diverse working activities within the Institute, Ancillary Safety Statements have been prepared for different functional areas. These statements focus on specific activities within the functional area concerned and the safe work practices appropriate to that area.

This Ancillary Safety Statement relates to the combined CASH-Synergy Centre.

It is a prime objective of the CASH-Synergy Centre to achieve and sustain high standards of Health and Safety and Welfare in so far as is reasonably practicable. This means at a minimum to conform to the requirements of Irish legislation as it pertains to Occupational Health and Safety.

In particular the CASH-Synergy Centre recognizes its responsibility and commits itself where reasonably practicable to:

- Provide and maintain safe and healthy working conditions, taking into account statutory requirements;
- Provide training and instruction where necessary, to enable staff and students to perform their work safely and effectively;
- Make available all necessary safety devices and protective equipment and supervise their use;
- Maintain a constant and continuing interest in health and safety matters pertinent to the centre;
- Keep this safety statement and other safety documents under review.

The Ancillary Safety Statement should be read in conjunction with the Parent Safety Statement so that all the work activities are covered.

## Section B. About CASH, Synergy, the Safety Committee, and Responsibilities

### About the Centre of Applied Science for Health

The Research Laboratories of the Centre of Applied Science for Health (CASH)<sup>1</sup> are located the CASH building adjoining the Synergy Business Incubation Centre at TU Dublin – Tallaght Campus. The building is designed for multi-disciplinary research studies with a focus on health in the areas of microbial host interactions, molecular and cellular biology, micro-sensors based on electroanalytical signal generation, synthetic chemistry, and biomechanical engineering. The laboratories are open to all academic staff members who should submit applications for bench space to the CASH Centre manager for approval.

### About the Synergy Incubation Centre

Based on campus at TU Dublin – Tallaght Campus, Synergy Centre is the innovation centre of South Dublin County, providing office space and business supports to early-stage enterprises. Its focus is on the high technology and knowledge intensive sectors. Synergy's aim is to enable industry and academia to interact to create viable enterprises for South Dublin County that will secure the area's future in terms of job creation, innovation and export potential. Synergy Centre is a modern, purpose built incubation centre with over 1,000 sq m of accommodation catering for all shapes and sizes of early-stage business, providing:

- office space for technology driven ventures with high potential;
- concept desks for entrepreneurs with an early stage idea; and
- networking opportunities in an entrepreneurial community.

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<sup>1</sup> The Centre of Applied Science for Health is funded under the Higher Education Programme for Research in Third Level Institutions – Cycle 4 and co-funded by the European Union under the European Regional Development Fund.

## CASH-Synergy Centre - Organization and Responsibilities

The overall assignment of responsibilities and the identification of “responsible persons” are detailed in the Parent Safety Statement. The “responsible persons” for the CASH-Synergy Centre are:

- Mary Deasy (CASH Centre Manager)
- Jack McDonnell (Industry Liaison Manager)
- Updated name to be confirmed (Synergy Centre Manager)

They are supported by the CASH-Synergy Safety Committee (CSSC) which reports the TU Dublin – Tallaght Campus Safety Committee. All CASH Centre Principal Investigators and Technical Support staff are standing members of the CSSC. In addition the CSSC has two representatives from the postgraduate research student body based in the building, and other areas of the university campus that provide support for the Centre.

Suggestions on improving the Health and Safety conditions are always welcome by contacting a CSSC member. The content of this handbook is subject to change at any time deemed necessary by CSSC with the approval of the Head of Development.



## Section C. Health, Safety & Welfare in the CASH-Synergy Centre – Key Principles

### General and Specific Duties of Staff

Employees are requested to read the Safety, Health and Welfare at Work Act, 2005 a copy of which is available at <http://www.oireachtas.ie/documents/bills28/acts/2005/a1005.pdf>.

Attention is drawn particularly to Section 13 (p23-25) - see Appendix 1.

Employees are requested to read the Parent Safety Statement. Attention is drawn particularly to the emergency evacuation procedures (Appendix 3).

This Code of Safe and Ethical Conduct in the CASH-Synergy Building is intended to act only as a guide to all personnel on the most essential aspects of various areas of activity in the building. It is intended to cover situations commonly encountered by users of the CASH building. New or undefined activities should be the subject of a risk assessment exercise approval process before they are commenced.

This Code will guide researchers and other employees working in the C.A.S.H. building in the performance of their professional responsibilities and express the basic requirements of ethical and professional conduct.

The Code of Conduct calls for all employees to evaluate the risks and benefits of their actions on all stakeholders and ensure these actions meet highest ethical standards.

Research activities are to be guided by the TU Dublin Ethics in Research Policies and the TU Dublin Ethics Committee will make judgements as to the appropriateness of research activities.

### The ethical principles underpinning this code are:

- 1) Act in the best interests of everyone.
- 2) Be honest with everyone and yourself.
- 3) Do no harm and if possible provide benefits to others.
- 4) Act with integrity.
- 5) Avoid conflicts of interest.
- 6) Respect privacy, confidentiality, and anonymity.
- 7) Provide all resultant data.



## Examples of the Practice of the Principles

### 1) Act in the Best Interest of Everyone

- Be aware of relevant standards, principles, and generally accepted methods.
- Undertake professional assignments only when qualified by education or experience.
- Operate within the financial constraints of your budget.
- Seek to continually develop and maintain your skills and competence.
- Seek and use peer review as well as providing constructive critical review of the work of others whenever appropriate.

### 2) Be Honest with Everyone and Yourself

- Do not knowingly mislead others about the progress of your work.
- Be constructive with criticism providing objective recommendations consistent with accepted norms.
- Give credit to the intellectual property right of work, methods, knowledge and opinion created by others in such a way that all involved are appropriately acknowledged.

### 3) Do No Harm and If Possible Provide Benefits for Others

- Do not expose others to any unreasonable physical, mental or emotional stress.
- Take reasonable steps to avoid harming others and to minimize harm where it is foreseeable and avoidable.

### 4) Act with Integrity

- Work in a spirit of respectful collaboration and cooperation with those with whom you interact and do not compromise their personal or professional integrity.
- Do not discriminate against their others on the basis of age, gender, gender identity, race, ethnicity, culture, national origin, religion, sexual orientation, disability, socioeconomic status, or any basis proscribed by law.
- Never knowingly use material that is illegal, immoral, or which may hurt or damage a person or group of people. If exposed to illegal material, advise the person of the illegal nature of the material and take reasonable steps to inform relevant authorities of the existence of the material.

**5) Avoid Conflicts of Interest**

- Avoid all known conflicts of interest with others and promptly inform your employer of any business association, interests, or circumstances that could influence judgments or the quality of research.
- Do not accept any assignments that would knowingly create a possible conflict of interest.

**6) Respect Privacy, Confidentiality, and Anonymity**

- Do not reveal information that identifies persons without their permission and take reasonable precautions to avoid unintentional disclosure of such information.
- Ensure that subjects of any study provide informed consent for use of all data collected.

**7) Provide All Resultant Data**

- Manage projects and tasks so as to ensure the validity of the results and communicate the results of research in a fair and balanced manner.
- Accurately report the positive, the negative, and the inconclusive results from research activities.

## Training

All CASH-Synergy Centre staff will receive induction training to ensure that they fully understand the hazards to which they may be exposed and the safety precautions and emergency procedures required.

Training will be given, as appropriate, in the items listed below. This training is given to staff involved in activities, which necessitates such training. The Department detailed below is responsible for delivery of initial and refresher courses.

Any training provided will meet the requirements of appropriate legislation, standards or guidelines and will be given by qualified instructors.

| Training                             | Department          |
|--------------------------------------|---------------------|
| CASH-Synergy Centre Safety Statement | CASH-Synergy Centre |
| Parent Safety Statement              | Human Resources     |
| Fire Safety                          | Human Resources     |
| Accident and Emergency procedures    | Human Resources     |
| Safe Manual Handling                 | Human Resources     |

Safety training records will be maintained by the HR Department, and will contain the following information:

- Date of Instruction / Exercise
- Duration
- Instructor
- Instructed
- Nature and content of instruction

## Section D. Personal Behaviour in the CASH-Synergy Building

1. All persons in the CASH-Synergy building are expected to act in a **conscientious and responsible** manner; be responsible to yourself, your supervisor/employer, and all other persons. Exercise safe work practices at all times.
2. **Personal safety and the security of all areas** within the building are of **utmost importance** and are for the well-being of all personnel. Observe the established safety and security rules. Violation may result in **temporary or permanent suspension** of access to the CASH-Synergy building.
3. **Be aware of the risks posed by your own work both for you and for others and be aware of the work being carried out by others in your vicinity.**
4. Assignment of office, bench or desk space to personnel in the CASH-Synergy building requires:
  - 4.1. In the case of students and researchers employed by the college, approval from the Centre Manager or the Department of External Services on the recommendation of an academic supervisor / Lead PI. **Primary responsibility for the conduct of each worker in the CASH building rests with the supervising academic staff/lead PI.**
  - 4.2. In the case of Synergy Centre clients, the Centre Manager, the Industrial Liaison Officer, or the Department of External Services. **Primary responsibility for the conduct of each client employee in the Synergy Centre rests with the relevant employer. Primary responsibility for the conduct of each of Synergy Centre employee rests with the Centre Manager.**
5. **Willful sabotage** of equipment or the work of others, if proven, will result in **immediate action** being taken against the offender and, in the case of students and college employees, serious cases may result in expulsion from the Institute.
6. In college laboratories, all equipment, chemicals and reagents are considered Institute property. **Unauthorized removal of such items from the building will result in disciplinary action.** If the **offence is judged serious**, such as unauthorized removal of toxic or biohazardous materials from the lab, **immediate expulsion** may also be imposed by the Institute on recommendation from the CSSC.
7. Use of **personal laptop/tablet and laboratory computers** in the building should be **primarily for work-related activity**. Unlawful downloading and computer gaming are forbidden.
8. Observe the **safety rules for the use of all equipment and areas**. Failure to do so may result first in warning and subsequently in suspension of rights to use the equipment/area.
9. In laboratories, observe **good laboratory practice** at all times:
  - a) No eating and drinking except in designated areas;

- b) Laboratory coats, safety glasses, and shoes that cover your feet and toes should be worn at all times in laboratory areas. Additional personal protective equipment (PPE) should be worn as required when performing tasks carrying additional risk e.g. handling of liquid nitrogen requires a faceguard and thermal safety gloves;
  - c) Maintain the cleanliness of work areas;
  - d) Do not be wasteful; be environmentally aware when disposing of all wastes.
10. Visitors are expected to observe normal safe work practices at all times.
11. In case of **accidents or incidents, report them immediately** to the relevant building manager and project supervisors/employers. Persons who fail to do so may be held responsible for property damages and personal harms leading to **financial compensation and/or legal action.**

## Section E. Safe Work Practice for Health and Safety in the CASH-Synergy Building

### E1. General

1. **Avoid, eliminate or minimize hazards where and whenever possible.**
2. Comply with the **occupational health and safety and welfare (HS&W) policies and guidelines.**
3. Make proper use of all **safety devices and personal protective equipment.**
4. Seek information or advice where necessary, or when in doubt, before carrying out new or unfamiliar work including **operating unfamiliar equipment.**
5. For laboratory areas, as prescribed by HS&W guidelines, at all times observe the appropriate **laboratory dress code** involving the following Personal Protective Equipment (PPE):
  - a. Clean **labcoat or alternative protective clothing** (may be specified by the supervisor or lab manager).
  - b. Proper protective enclosed **footwear.**
  - c. **Safety glasses** to be worn; additional full face protection may be required in some cases.
  - d. **Disposable examination gloves** as appropriate to the situation.
  - e. **Long hair** should be tied back to avoid injury.
  - f. When working with concentrated fumes, the use of **contact lenses** should be avoided.
6. The following **additional PPE** is provided and should be used where required / instructed / determined by a risk assessment or Chemical MSDS or by the supervisor:
  - a. Safety Glasses / Goggles / Face Shield.
  - b. Additional Protective Gloves (e.g. while working with liquid nitrogen, or while using hazardous solvents and chemicals).
  - c. Dust Mask / Respirator.
  - d. PVC Apron.
  - e. Hearing Protection.
7. **Food or drinks are not to be consumed within laboratories.**
8. Be familiar with **emergency and evacuation procedures**, including the location and use of emergency equipment such as safety showers, eyewash facilities and fire extinguishers, first aid box, emergency contact numbers as well as the fire exit plan.
9. Store **chemical and flammable chemicals/reagents** at specified areas allocated in the lab or store areas. Ensure the appropriate segregation of chemicals.

10. Working with or use of **radioactive sources are at present prohibited** in the lab as no radioactive safety facilities are currently available.
11. Report to the supervisor any **medical conditions or allergies** that may present as a risk while working in a lab environment.
12. Report and record **all accidents and near-miss incidents** with the lab officers as stipulated in the HS&W policy (Report Form - **Appendix 9**). Seek first aid from lab officers or trained first-aid officers who can be contacted by the emergency numbers/hotline posted at strategic locations within the building.
13. Report to the presence of any **defective equipment or detected hazards** to the relevant building manager.
14. All lab personnel intending to work or use the lab **after-office hours, on weekends or on public holidays** must obtain prior **permission from their supervisor** using specified application forms (**Appendix 5**) available at the Administration Office. Activities falling under Risk Categories A and B (see **Appendix 5**) require there be at least **TWO** persons present in the lab. Activities under Risk Categories D to E may be carried out by lone workers.
15. At the end of any experiments or before leaving the lab, all equipment that need not remain on must be switched off.

## E2. Biosafety for Class II Microbiology Laboratory

### Purpose

To outline to workers and visitors any potential hazards, and the precautions to take when visiting a laboratory area that handles Class II microorganisms. Standard operating procedures for all activities conducted in a Class II lab are set out in **Appendix 14**. They are also attached to the Department of Science Biosafety Manual.

These protocols and procedures apply to:

- Visitors entering a hazardous Laboratory area.
- Workers working in the Class II laboratory facility.

### Definitions:

- Visitor: Anyone inspecting or being shown a hazardous Laboratory area.
- Workers: Anyone who performs work or provides a service such as Service/Maintenance Technicians etc.



### **Protocol for Visitors**

As a visitor to the laboratory, you should understand the hazards that may be present and the precautions that you need to take:

1. Hazards in the laboratory may include chemical and biological. Ensure that an employee explains what hazards may exist in the area you are visiting, and what safety precautions you need to follow.
2. Always wear the appropriate personal protective equipment (see below in Personal Protection for Workers) when visiting a testing area. Before leaving the lab, remove the personal protective equipment and wash your hands.
3. If any emergency evacuation alarm occurs, follow the evacuation route instructions of staff.
4. If you have any questions please direct them to the area supervisor or designate.

### **Personal Protection for Workers**

1. Laboratory coveralls, gowns or uniforms must be worn at all times for work in the laboratory.
2. Appropriate gloves must be worn for all procedures that may involve direct or accidental contact with blood, body fluids and other potentially infectious materials or infected animals. After use, gloves should be removed aseptically and hands must then be washed.
3. Personnel must wash their hands after handling infectious materials and animals, and before they leave the laboratory working areas.
4. Safety glasses, face shields (visors) or other protective devices must be worn when it is necessary to protect the eyes and face from splashes, impacting objects and sources of artificial ultraviolet radiation.
5. It is prohibited to wear protective laboratory clothing outside the laboratory, e.g. in canteens, coffee rooms, offices, libraries, staff rooms and toilets.
6. Open-toed footwear must not be worn in laboratories.
7. Eating, drinking, smoking, applying cosmetics and handling contact lenses is prohibited in the laboratory working areas.
8. Storing human foods or drinks anywhere in the laboratory working areas is prohibited.
9. Protective laboratory clothing that has been used in the laboratory must not be stored in the same lockers or cupboards as street clothing.

### General Operating Procedures

1. Pipetting by mouth must be strictly forbidden.
2. Materials must not be placed in the mouth. Labels must not be licked.
3. All technical procedures should be performed in a way that minimizes the formation of aerosols and droplets.
4. The use of hypodermic needles and syringes should be limited.
5. All spills, accidents and overt or potential exposures to infectious materials must be reported to the laboratory supervisor. A written record of such accidents and incidents should be maintained as per HS&W policy (Report Form - **Appendix 9**).
6. Written procedure for the clean-up of all spills must be followed.
7. Contaminated liquids must be decontaminated (chemically or physically) before discharge. An effluent treatment system may be required, depending on the risk assessment for the agent(s) being handled.
8. Written documents that are expected to be removed from the laboratory need to be protected from contamination while in the laboratory.

### Protocols for Laboratory Working Areas

1. The laboratory should be kept neat, clean and free of materials that are not pertinent to the work.
2. Work surfaces must be decontaminated after any spill of potentially dangerous material and at the end of the working day.
3. All contaminated materials, specimens and cultures must be decontaminated before disposal or cleaning for reuse.
4. Packing and transportation must follow applicable national and/or international regulations.

## E3. Waste Management and Disposal

1. Working spaces are to be kept **tidy and clean**. Broken glass, sharps and laboratory wastes must be placed in the marked bins in the laboratory.
2. No hazardous or chemical waste is to be left or placed in the sinks, and be washed down the sink. Refer to the lab manager on where and how to store or dispose chemical, biological and other potentially hazardous wastes.
3. Disposable gloves should be placed into yellow bins (Laboratory Waste Bin) which are specifically marked for such a purpose.
4. Biowaste must be segregated for autoclaving before transfer to specified waste bins for collection.

## E4. Lab Health and Safety Awareness Programme

Lab users, research staff and postgraduate students are required to read this document and sign a copy of the Health & Safety Familiarization and Personal Behaviour in the Laboratories Declaration form (**Appendix 13**).

New postgraduates should attend an **H&S induction programme** on commencement of their employment or research project involving the use of equipment and facilities in the Research Lab. (The induction programme will be conducted once every semester, when there is a new intake of lab users and/or when there is a need to do so at the discretion of the respective supervisors). Specific instructions covering health and safety information on the following will be made known to during the programme:

1. General lab safety
2. Chemical safety
3. Biological safety
4. Waste management and storage
5. Emergency procedures and first aid
6. Biohazards, infectious agents and biosafety labs
7. Proper use and maintenance of specialized equipment (autoclaves, centrifuges etc.)

Specific instructions covering health and safety requirements relating to project specific tasks will be the responsibility of the project supervisor(s).

## E5. Risk Assessment

In the laboratory, the chemical agents in use present the most common risks. Correct risk assessment of exposures to chemicals requires knowledge of the chemicals in question and use of a systematic approach to identifying the possible means of exposure. The level of risk of harm to the individual is also affected by the duration and frequency of exposure. **Appendix 7** provides a Chemical Agents Risk Assessment Form.

In considering the control measures to be put in place the employer must take into account the following hierarchy of control measures:

- a) Can the process or activity be modified so that the hazardous substance is not needed or generated?
- b) Is it possible to replace the substance with a safer alternative?
- c) Is it possible to use the substance in a safer form e.g. pellets instead of powder?

If prevention (by elimination or substitution) is not reasonably practicable then review the engineering controls available:

- a) Can the process be totally enclosed?
- b) Are partial enclosure and/or use of extraction such as Local Exhaust Ventilation (LEV) possible?
- c) Is General Ventilation provided?
- d) Can systems of work and handling procedures which minimize the chances of hazardous materials leaking or otherwise escaping, e.g. using a dosing pump to add material as opposed to pouring, be used?
- e) Can the number of employees potentially exposed be reduced or can the duration of exposure be reduced?

PPE, including respiratory protective equipment (RPE), will only protect the person wearing it subject to its being appropriate, suitable and the person is trained etc. It will not reduce the exposure to the work environment or protect those in the vicinity of the exposure who may not be wearing PPE (including RPE). Generally PPE should not be the primary means of protection used for workers. PPE is a 'last resort' and other means of control must be considered before its use. Frequently, to achieve adequate control, an employer must implement a number of different control measures collectively.

**The Regulations require the employer to control exposure to hazardous chemical agents to as low a level as is reasonably practicable.**

**There are separate risks associated with handling of, and exposure to biological agents, particularly those that are Class 2 or higher.** The protocols and procedures set out in the **Biosafety Manual** attached as an annex to this Safety Statement set out the additional preventative and risk assessment measures that should be addressed in advance of using such organisms in a Laboratory clearly identified and set up as a Class 2 Microbiology Laboratory. The Biosafety Manual in the CASH Safety Statement Annex document should be kept in the Class 2 Laboratory and should be consulted and complied with before work with Class 2 microorganisms starts. All personnel working with such organisms should be trained appropriately before entering and working in a Class 2 Laboratory. The Class 2 activities require a separate risk assessment that should be carried out by trained personnel and signed off on before lab commissioning for handling with these organisms.

**Biosafety Agents 1 and 2 Differences**

| <b>BSL</b> | <b>Agents</b>   | <b>Practices</b>  | <b>Safety Equipment (Primary Barriers)</b>  | <b>Facilities (Secondary Barriers)</b>  |
|------------|---|---|---|---|
| <b>1</b>   | Not known to consistently cause diseases in immunocompetent adult humans                        | Standard microbiological practices  | None required   | Open bench top, sink required   |
| <b>2</b>   | Associated with human disease. Hazard: percutaneous injury, mucous membrane exposure, ingestion | BSL-1 practices plus: <ul style="list-style-type: none"> <li>• limited access</li> <li>• biohazard warning signs</li> <li>• sharps precautions</li> <li>• biosafety manual defining waste decontamination or medical surveillance policies</li> </ul> | Primary barriers: Class I or II biosafety cabinets or other physical containment devices used for all manipulations of agents that cause splashes or aerosols of infectious materials; PPE: laboratory coats, gloves, face protection as needed | BSL-1plus: <ul style="list-style-type: none"> <li>• non-fabric chairs and other furniture easily cleanable</li> <li>• autoclave available</li> <li>• eyewash readily available</li> </ul> |

## E6. Hazard Identification and Risk Control Measures

### HAZARD INSPECTIONS

It is university policy to identify hazards in the workplace, assess the risk to safety and health, and control risks as far as is practicable so that they are reduced to an acceptable level. Safety audits are carried out periodically. "Hazard" is taken to mean "any substance, article, material or practice which has the potential to cause harm to the safety, health or welfare of employees at work".

"Risk" is taken to mean "the potential of the hazard to cause harm in the actual circumstances of use".

A risk assessment is an examination of what in the workplace could cause harm to people so that the employer can weigh up whether enough precautions have been taken or that more should be done to prevent harm. Workers and others have a right to be protected from harm caused by a failure to take reasonable control

measures. Risk Assessment is based on linking the probability of occurrence with the severity of loss and /or injury:

| Probability of Occurrence | Severity of Loss or Injury |        |        |
|---------------------------|----------------------------|--------|--------|
|                           | 1                          | 2      | 3      |
| 1                         | Low                        | Low    | Low    |
| 2                         | Low                        | Medium | Medium |
| 3                         | Medium                     | Medium | High   |

Here, risks are graded as “High”, “Medium” or “Low”, where:

- **High:** Occurrence is probable, and could cause a fatality, serious injury or serious ill health to an individual or group of people.
- **Medium:** Occurrence is possible and could cause injury or ill health to an individual or a small group of people.
- **Low:** Occurrence is possible but unlikely, only minor injury would be caused and would probably be limited to a single individual.

Risks classified as “low” are deemed to be acceptable as they stand, or with the current controls in place. “Medium” risks should be reduced as low as is reasonably practicable. “High” risks should be eliminated or greatly reduced as soon as possible.

### Risk Control

The classification of hazards may be used to develop the priority of control measures, remedial actions, and the allocation of resources.

Where practicable the college commits itself to the elimination of hazards or to the reduction of hazards to an acceptable level, whether that be by the provision of access arrangements, risk assessment, containment, the provision of special equipment, training, information, adequate supervision, etc. This approach will take into account normal good practice and the use of standards and guidelines where these are available.

The written risk assessment of the chemical agents must take the following into consideration:

1. Hazardous properties



2. Information provided by the supplier of the hazardous chemical agent including information contained in the relevant safety data sheet and any additional information as may reasonably be required to complete the assessment.
3. The level, type and duration of exposure.
4. The circumstances of work involving such agents and the quantities stored and in use in the workplace.
5. Any occupational exposure limits value or biological limit value contained in an approved code of practice.
6. The effect of preventative measures taken.
7. Where available the conclusions from health surveillance already undertaken.
8. Any activity including maintenance and accidental release in respect of which it is foreseeable that there is a potential for significant exposure.

The written risk assessment should be followed up with:

- a) Arrangements to deal with accidents, incidents and emergencies.
- b) Information and training as required.
- c) Health surveillance or occupational monitoring if required.
- d) Approval by safety coordinator.
- e) Reviews at regular intervals or following significant changes in work practices.

#### **GOVERNING LEGISLATION**

- *Safety, Health and Welfare at Work 2005.*
- *Chemicals Act 2008.*
- *Safety, Health and Welfare at Work (Carcinogens) Regulations 2001.*
- *European Communities (Dangerous Substances and Preparations) (Marketing and Use) Regulations 2003 and Amendments, 2006 and 2008.*
- *European Communities (Classification, Packaging, Labelling and Notification of Dangerous Substances) Regulations 2003.*
- *European Communities (Classification, Packaging & Labelling of Dangerous Preparations) Regulations 2004 and Amendments, 2007 and 2008.*
- *Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001, HSA 2007 (Ref. HSA0240).*



## E7. Electrical Safety

### General Electrical Safety

#### Hazards

- Electric power is a hazard with the power to cause any of the following:
- Electric Burns
- Electric Shock
- Fire
- Trips or falls over loose cables

**Risk Assessment**      **High**

#### Control Measures

- All new fixed and temporary wiring will be to the latest Irish standards (either BS, EN or CE standards) and in compliance with ETCI (Electro-Technical Council of Ireland) rules for electrical installations.
- The Institute will ensure that a competent qualified electrician checks the wiring installation on the premises.
- All electrical repairs, splices, and wiring shall be performed by a competent and fully qualified electrician to comply with ETCI (Electro-Technical Council of Ireland) standards. Only a qualified person may attempt to affect repairs, either temporary or permanent, to the electrical supply system or to any electrical appliances.

#### Wiring Equipment and Machinery

- Any person carrying out work on the electrical installation or any accessories or equipment connected thereto should normally isolate the equipment first by removing the main fuse or locking off the isolator. Live working will not normally be allowed and if there is a chance of inadvertent contact with live parts, then special precautions will be taken by authorised electricians, e.g. the use of insulated test prods, insulating rubber mats and other back-up precautions. In such circumstances a second person must be in attendance to render emergency assistance if required. If in doubt, the circuit must be tested using safe equipment to prove that it is dead.
- Notices must clearly indicate when live working is being carried out. No un-authorised personnel shall be allowed access to such an area while the work is in progress.

- All electrical equipment, appliances and leads shall be of good quality and in good working order and damaged leads, plugs, etc. should not be allowed to remain in service.
- Equipment must be fitted with correctly rated fuses.
- Sufficient sockets will be provided to prevent overloading by use of adaptors. Multi-outlet plugs can cause overloading on electrical wiring and shall not be used unless they have a built-in circuit breaker.
- Cables used for outdoor equipment will be of a heavy duty protected or armoured design. Armouring of conducting material must be earthed.
- Flexible cables should not be run across floors or be placed under heavy objects or on pathways or other areas where repeated abuse can cause deterioration of insulation. Where damage to cables at floor level is possible, protection by ramps, conduit or armouring will be considered and applied.
- All electrical equipment shall be properly grounded. It is essential that all accessible metalwork be earthed.
- Live parts of machines should be properly screened. Interlock switches provided for guards should not be capable of inadvertent operation.
- Flammable liquids should not be used or stored near to, or allowed to come into contact with live electrical parts.
- Where equipment is required for ongoing/overnight experimental work it should be clearly marked as such and should be recorded in the overnight experiment form (see section 35.3 (a) and (b)). Otherwise all equipment not in use should be switched off, especially at the end of a working day, unless of a specialist type, e.g. experimental apparatus in on-going use, fridges, growth cabinets.
- Electrical equipment (stirrers, shaker, rockers etc.) should not be left for long periods in the cold room and must be removed when the experiment is complete.

### Reporting Faults

- If for any reason there is an electrical fault, either partial or total, the technical staff and the Buildings department should be immediately contacted to attend and remedy the matter.
- Dangerous or defective material should be replaced or remedied. All extensions, alterations and repairs to electrical circuits should be carried out by a qualified electrician.

### Electrical Equipment in the Laboratory

- Staff should note the positions of all emergency electrical cut-off switches and their correct use.
- Only members of staff should turn on or off the electrical supply.

- In the case of students, no piece of electrical equipment may be turned on or plugged in, without first checking with a member of staff in its correct use.
- All electrical equipment used in a laboratory setting must be suitable for the task undertaken and the environment in which it is to be used. This is particularly important when selecting electrical equipment for use in wet environments or in areas where flammable chemicals are stored or handled.
- When laboratory electrical equipment is being serviced it should be thoroughly decontaminated beforehand so as to remove all chemical or biological contamination.
- Electrical equipment should be visually inspected on a regular basis to ensure that the potentially corrosive atmospheres in fume hoods and in areas where chemicals are stored and used have not damaged the equipment or its wiring.
- Electrical cables should not be run along the floor of laboratories or over lab benches.
- Laboratory electrical equipment should be unplugged overnight wherever possible.
- The start and stop devices on all laboratory electrical devices should be readily identifiable.

#### **Governing Legislation**

- *Safety Health and Welfare at Work Act 2005.*
- *Safety, Health and Welfare at Work (General Application) Regulations 2007, Part 3 – Electricity.*
- *Sources of Information*
- *National Rules for Electrical Installations, (4<sup>th</sup> Edition), Electro-Technical Council of Ireland, 2008 (Ref. ET101).*

## E8. FIRE SAFETY

### Fire prevention

- Never place hot plates or other heating devices against walls or close to bench partitions.
- Gas burners should be isolated from the bench by heat-resistant material.
- Inspect gas tubing regularly and reject any that shows hardening or cracking.
- Open flames should only be used after carefully considering any adjacent apparatus, drafts, walkways, exits and other experiments.
- Flammable liquids should never be poured into the sink or laboratory drainage systems. This applies also to compounds liable to give off toxic fumes. For the correct disposal procedure consult the laboratory demonstrator in each case.
- Flammable liquids should only be stored in special fire resistant cabinets equipped with drip-trays or sumps.

**Fires are sometimes caused by the `magnifying glass' effect of bottles and spherical flasks filled with liquid and standing in the direct rays of the sun.**

### FIRE EXTINGUISHERS

- Get to know the position of fire extinguishers in the laboratory and learn under what conditions they can be used. Extinguishers should be fully visible and unobstructed.
- Get to know the positions of the fire hose reel, water buckets, sand buckets and fire blanket.
- Remember that ordinary combustible materials (wood, paper, textiles) can be readily extinguished with water. Dry sand is a very effective means of extinguishing alkali metal fires, so is dry soda ash.
- Common types of fire extinguishers are:

#### *Carbon dioxide*

- Carbon dioxide (CO<sub>2</sub>) extinguishers are for general purposes and have the advantage that they leave no mess around the site of the fire. The action of smothering the fire with carbon dioxide excludes air and extinguishes the flames.
- Carbon dioxide extinguishers are suitable for dealing with burning fluids on both horizontal and vertical surfaces as well as for fires involving ordinary combustible materials such as wood, paper and textiles. As a non-conductor of electricity, carbon dioxide can be safely used where there is a risk of electric shock. It is also suitable for use on fires involving delicate laboratory equipment.

- The disadvantages of carbon dioxide extinguishers are:
  - It is necessary to get fairly close to the actual fire for them to be effective.
  - They have limited cooling action, and with solvent fires there may be re-ignition after the fire has been extinguished.
  - If used on substances which react with carbon dioxide, such as sodium, potassium and metal hydrides, they are ineffective and could even be dangerous. In these instances special purpose dry powder extinguishers should be used.
  - In confined spaces they reduce the oxygen level and can cause asphyxiation of the fire fighter.

#### ***Dry powder***

- Dry powder extinguishers deliver an inert powder on to the fire, and this rapidly extinguishes flames.
- Dry powder extinguishers are suitable for burning liquids and ordinary combustible materials. They have the disadvantage of leaving a deposit of powder. There are special purpose powder extinguishers which are effective against particularly hazardous fires such as those involving alkali metals and metal hydrides.
- Dry powder is also a non-conductor of electricity and can be safely used on fires where there is a risk of electric shock.

#### ***Foam***

- Foam extinguishers are of limited application and suitable for small fires in confined areas (eg a tray or oven) involving water-immiscible solvents such as petrol or oils. They form a blanket of foam which floats on the surface of the burning liquid, so that air is excluded and the fire extinguished.
- Foam must not be used where live electrical equipment is involved, or with alkali metals.

#### ***Water/carbon dioxide***

- Water/carbon dioxide extinguishers discharge water under carbon dioxide pressure. Although not suitable for chemical fires, they are very effective against ordinary combustible materials (wood, paper, textiles).

**Fire Extinguishers**

| Type of fire  | Suitable extinguisher               | Limitations   |
|---|-------------------------------------|---|
| Ordinary combustible materials: wood paper, textiles            | Water / carbon dioxide / sand       | never use water in the presence of electrical points or equipment |
| Flammable solvents oils, liquids electrical equipment           | Carbon dioxide / dry powder         |   |
| Gases   | Carbon dioxide                      |   |
| Sodium, potassium metal hydrides magnesium pyrophoric catalysts | Special purpose / dry powder / sand | Never use water or carbon dioxide on these fires                  |

**Fire blanket**

- Each laboratory should have a fire blanket for extinguishing fires on clothing.
- A person whose clothing catches fire should lie horizontally whilst another person smothers the flames with the blanket.
- Never use a fire blanket on apparatus.

**Emergency Evacuation**

- The evacuation procedure is given in the Section F of this document.
- Fire Wardens (named in Appendix 12) are in place assist in the evacuation of staff and students. Fire/Emergency Drills are organised annually by the Estates Manager or his assistant and the local Fire Wardens. Feedback on performance in terms of time taken to evacuate and particular difficulties with alarm systems / building fabric are notified to all staff via e-mail. Where the performance of a particular building in a fire drill falls short of the required standard, further drills will be carried out to confirm that required standard is reached.
- The Evacuation procedure is posted on the Health & Safety Website. A building by building listing of all trained Fire Wardens is also posted on the web. All Schools/Units/Campus Companies are required to ensure that they have sufficient trained Fire Wardens in place to provide for effective evacuation.

### Persons with Designated Responsibilities

- The Estates Manager will be responsible for informing the College Safety Officer of any structural alterations that may affect the safe means of escape from the building in case of fire. It is the responsibility of the Estates Manager to ensure that all fire exits are kept clear, unlocked and functional when the building is occupied.
- Each building is fitted with a fully addressable Fire Alarm System which is maintained by the Estates Office. All alarm activations are received in the Buildings Services Office and are investigated by Caretaking / Security personnel.

### Duties of the Fire Wardens

- A list of emergency numbers is given in **Appendix 12**.
- On hearing the alarm, they take charge of their section, ensuring the efficient escape of all persons.
- Check that all persons have left, close all doors and windows, switch off equipment if safe to do so (and if time permits) and leave all lights on.
- Report to the "Incident Controller" (one of the caretaking staff), who will be located outside the main front doors of the Institute, that their section is clear.
- If they know of anyone who is injured or trapped, they should inform the Incident Controller with maximum haste, giving all relevant information.
- Wardens should be aware of any person who is a wheelchair user or has impaired hearing, in order to assist them to a safe place. **Wheelchair** users should be brought to the landings in the fire escape staircases. They may have one person remain with them until they are assisted from the building.
- During fire drills, the Wardens should check that the alarm is heard throughout their section, noting any deficiencies in toilets, inner offices etc.
- Make note of any problems/observations for later discussion.
- On evacuating their area, the wardens will assist with the orderly and safe movement of personnel through the corridors, down the stairs and out of the building.
- Wardens should be familiar with the names and areas of responsibility of their fellow wardens on the same floor as indicated on the list. They should take over the responsibility of another area if it is apparent that the warden for that area is absent.



### What to do in the event of a fire in a laboratory

- In the event of fire in the lab the following should be considered;
- Raise the alarm by breaking the nearest available break glass point.
- Dial 999 on an external line to call the fire brigade. The caretaking staff should be contacted by dialing 2610 / 2601 to alert them to the extent of the fire.
- The area must be evacuated immediately following the procedures outlined in the emergency evacuation procedure. The fire wardens in the area will normally perform this role.
- If the fire is small and contained, faculty/staff should consider using the nearest appropriate extinguisher provided, ensuring that the extinguisher is compatible with the fire.
- Carbon dioxide fire extinguishers may interact negatively with some lab chemicals. Dry powder extinguishers should generally be used on chemical fires.
- Water must never be used on an electrical fire or flammable liquid fires.
- Under no circumstances should students tackle the fire.

### Fire Prevention – Risk Assessment

#### Hazards

- In common with all premises there is always a risk of fire. Common fire hazards in laboratory and office areas include improperly stored combustible or flammable materials, use of naked flames (Bunsen burners) and faulty electrical equipment.

**Risk Assessment**                      **Medium**

#### Control Measures

- In order to guard against an outbreak of fire and to ensure as far as is reasonably practicable the safety of persons on the premises in the event of an outbreak of fire the following control measures have been put in place along with the responsible person.
- The instruction and training of staff in the use of fire extinguishers – Estates Manager.
- The holding of fire and evacuation drills – Estates Manager.
- The maintenance of escape routes – Estates Manager.

- The provision, inspection and maintenance of adequate fire protection equipment and systems – Estates Manager.
- The provision of assistance to the fire authorities – Estates Manager.
- Maintenance of Bunsen burner tubing – Technical Staff.

#### **GOVERNING LEGISLATION**

- *Fire Services Act, 1981.*
- *Fire Safety in Places of Assembly (Ease of Escape) Regulations, 1985.*
- *Licensing of Indoor Events Act 2003.*
- *Safety, Health and Welfare at Work (SHWW) Act, 2005.*
- *Safety, Health and Welfare at Work (General Application) Regulations, 2007.*
- *Building Regulations 1997 (Technical Document B) Fire Safety.*

## Section F. Security and Emergencies in the CASH-Synergy Building

### 1. In the event of a fire, or on detecting smoke or flames:

- a. Confine the fire by closing the door.
- b. Activate the nearest fire alarm.
- c. Report the fire to the relevant authorities, to Building Services, and to the Estates Manager.

### 2. Telephone 9-911 / 9-119 / 9-112 for emergency assistance:

- a. State your name and exact location. Indicate where the problem is and if there are any injuries. Do not hang up until told to do so.
- b. Evacuate the building by walking (not running) to the nearest FIRE EXIT and leave the building. Do not use elevators. Once out of the building, do not re-enter until told to do so.

### 3. If you hear a fire alarm:

- a. Shut off open flames. Safely store hazardous materials. Leave your work location.
- b. Shut all doors behind you as you leave. Evacuate the building through the nearest FIRE EXIT. Do not use elevators.
- c. Fire Wardens must ensure that all personnel evacuate the building and that all individuals who may need help are assisted to safety (see Appendix 12 for list of Fire Wardens).

### 4. In the event of a chemical spill:

- a. Notify everyone in the room (or area) that a spill has occurred. In serious cases, activate the fire alarm.
- b. Eliminate potential sources of ignition, such as lights, motors and Bunsen burners.
- c. Leave the area/room immediately and close door behind you.
- d. Notify the Lab Manager/ Safety Officer /Supervisor.

**5. First aid for chemical contamination:**

- a. Go to the nearest eyewash station or safety shower.
- b. Flush the contaminated area with large volumes of water.
- c. While flushing, remove clothing that may have been contaminated.
- d. Continue flushing until the Safety Officer/ Supervisor arrives.

**6. Lab security:**

- a. Wear ID at all times.
- b. Ensure that hazardous materials such as toxic agents and materials are secured.
- c. Study and be familiar with the fire escape route map (**Appendix 10 & 11**).

**7. Keys to the main door of the lab:**

- a. The main doors to the Research Laboratories / Client Company Units doors are locked at all times. Authorized persons are issued with a swipe card/key by the Assistant Estates Manager (in the case of ITT researchers) or the Synergy Centre Manager (in the case of client companies) to enable access to those areas relevant to them.
- b. Swipe cards/keys are **NOT to be given to others** under any circumstance; each card/key holder bears full responsibility for in keeping their card/keys in a secure place.
- c. If swipe cards/ keys are lost, report it as soon as possible to the building manager and Building Services for a replacement.
- d. Students and researchers are required to pay a small refundable deposit for the swipe-cards/keys. When the cards/keys are returned on graduation, the deposit is refunded in full.

**8. Attendance record of visiting lab personnel**

- a. All visiting researchers to the lab should get permission from supervisors in advance using the Visiting Researcher form (**Appendix 3**). The supervisor must obtain access permission from the Research Office and identify the nature of the work, if any, to be conducted, any specific safety requirements, and the duration of the visit.
- b. On arrival, the visitor must report to the Research Office in C.A.S.H. before entering any lab or commencement of any work.

## Section G. Use of Instruments & Equipment

1. A **log book** is provided to record the usage of each major instrument. The log book is at all times placed beside each instrument. Attempt to alter or remove records in the log book is a serious offence.
2. The user is required to record his/her usage of that instrument in the log book; accurate recording is mandatory.
3. User may **pre-book the instrument** by booking through the log book not more than 3 days before the usage. If the need to use the instrument is voided, please remember to cancel the booking.
4. Pre-booking of the instrument is restricted to one cycle of use in an experiment for a maximum of 4 hours or more depending on the nature of experiment.
5. Users are required to record any **errors or breakdown of the equipment** and report the incidence to research technician/building manager immediately. Failure to report an instrument breakdown may result in a disciplinary action.
6. Users are advised to handle each instrument **responsibly** and exercise best practice at all times.

### G1. Risk Assessment of Key Instruments

#### *AUTOCLAVES*

##### HAZARDS

- Explosion
- Hot pipe work
- Contact with steam
- Burn risk when removing hot material
- Manual handling of hazardous, hot and awkward loads
- Biohazardous materials

##### RISK ASSESSMENT

Medium

##### CONTROL MEASURES

- Users must be properly trained before using any autoclave.
- The manufacturer's instructions should be carefully read before using equipment.

- Every user must notify technical staff of any evidence of wear to an autoclave which may compromise its safe operation.
- The equipment should be tested periodically with biological indicators to ensure correct temperatures are being attained.
- Protective clothing – heatproof gloves and safety glasses – must be worn at all times during loading and removal of materials. Heatproof gloves should periodically be checked for evidence of wear.
- The contents of the autoclave should be stacked carefully and baskets or buckets not overloaded.
- Safe manual handling techniques must be employed to prevent injury when loading and unloading the autoclave. Items should be removed with great care as liquids may boil over when moved.
- The correct programme for the type of material to be treated must be selected.
- All spills and leakages must be mopped up immediately.
- Lids of screw-capped bottles should be loosened before autoclaving to prevent pressure build-up.
- The water level must be checked and topped up if necessary.
- All autoclaves are fitted with interlocks to prevent opening of the door until safe temperature and pressure have been reached.

### ***CENTRIFUGES***

Accidents caused by the disintegration of centrifuge rotors are often very violent. All centrifuges should be fitted with a safety lock which must be engaged before the centrifuge rotor can be started and cannot be opened until the rotor has come to a complete stop.

### **HAZARDS**

- Foot and leg injury due to movement of unbalanced centrifuges and falling bench-top centrifuges
- Heavy rotors
- Incorrectly secured lids

### **RISK ASSESSMENT**

**Medium**

### **CONTROL MEASURES**

- All new staff and students must be trained in the operation of each centrifuge by an experienced user.
- The manufacturer's instructions should be carefully read and followed at all times.

- Recommended rotors, buckets, adaptors and tubes for each centrifuge should be used. Rotors must be installed correctly on the centrifuge spindle, and any fixing nuts must be tightened (but not over-tightened). The maximum capacity of sample containers and the maximum load for each rotor must not be exceeded.
- Material loaded into sample tubes must be compatible with the sample tube material, e.g. some solvents can cause tubes to swell and to crack.
- Sample containers should be leak-proof. Sample tubes should fit comfortably into the rotor and should not be too loose. Containers for spinning blood products should be closed to prevent aerosols.
- The load in the centrifuge must be carefully balanced and be distributed symmetrically across the rotor assembly.
- Bench-top centrifuges should be mounted on a sturdy, stable and level bench following the specifications of the manufacturer. Large centrifuges should be floor mounted and fixed in position.
- The access cover must not be opened until the rotating assembly has stopped.
- Rotors should be cleaned, dried and stored upside-down after use.
- All spillages within centrifuges must be cleaned immediately. Spills of hazardous material must be adequately decontaminated.

### **Maintenance**

- The apparatus must be disconnected from the power supply before any maintenance can be carried out. Only qualified persons should do maintenance.
- In order to prevent corrosion, spillages should be removed immediately. The centrifuge chamber, rotors and accessories should be thoroughly cleaned and dried.

### ***REFRIGERATORS, FREEZERS & COLD ROOM AREAS***

#### **HAZARDS**

- Explosion
- Fire
- Hazardous Chemicals
- Slips and falls (cold rooms).

#### **RISK ASSESSMENT**

**Low**



**CONTROL MEASURES**

- Cold storage facilities should be “spark-proof” for volatile solvents.
- Good housekeeping must be maintained i.e. all loose bottles and tubes must be kept securely in place with tightly sealed lids.
- All containers must be clearly labeled with the name of the contents, the owner and date.
- All spills must be cleaned immediately to prevent exposure to personnel using these facilities.
- Cold rooms must be fitted with non-slip floors.
- Cold rooms will have a release mechanism on the interior of the door in case of accidental door closure.

**CONFOCAL MICROSCOPE****HAZARDS**

- Slips, trips and falls
- Laser Cooling Unit
- Noise
- Exposure to Laser Light

**RISK ASSESSMENT      Low****CONTROL MEASURES**

- Ensure all cables, wires, etc for the computer; lasers, microscope and printer are positioned to the rear of the instrument.
- Do not obstruct cooling fans during operation.
- Do not tamper with or remove the protective grills on the front of the unit.
- Ensure adequate room ventilation to dissipate heat.
- Monitor noise levels periodically to ensure they are within health and safety limits.
- Appropriate training in the correct use of the equipment will be provided by trained personnel prior to use.
- Warning labels have been fixed near apertures or moveable parts where exposure to laser light is possible.
- Do not deviate from published operating or maintenance procedures. Consult the safety guide.

## **GOVERNING LEGISLATION**

The instrument is designed and manufactured to comply with applicable performance standards for Class 3B laser devices. It is not possible to anticipate every hazardous situation. Therefore, the user must exercise care, common sense and observe all appropriate safety precautions applicable to Class 3B lasers and high-voltage electrical equipment during installation, operation and maintenance.

This device complies with the requirements of both directive 89/336/EEC concerning electromagnetic compatibility and directive 73/23/EEC concerning low voltage. The CE marking indicates compliance with the above directives. The directives are applied based on the conformance to the requirements of technical standards. The standards below are used so as to verify the compliance with the directives.

## ***ELECTROPHORESIS SYSTEMS***

### **HAZARDS**

- Electrical shock

**RISK ASSESSMENT**      **Medium**

### **CONTROL MEASURES**

- Make sure that the supply voltage at the wall outlet corresponds to the marking on the instrument, before connecting the power cord. The unit must always be connected to a grounded power outlet.
- Do not block the rear and side panel of the instrument. The Power switch must always be easy to access. The power cord must always be easy to disconnect.
- Conduct visual check on equipment prior to use.
- The system has an automatic voltage cut-off when the safety lid is opened.
- The safety lid must be securely closed before starting a protocol.
- Operation and user maintenance should be performed by properly trained personnel only.
- Warning labels have been fixed to the system by the manufacturer.
- Do not operate in any other way than described in the operating manual. Consult the safety instructions.
- The instrument covers must not be opened by the user. It contains electrical circuits which can give an electric shock. Service and planned maintenance should be performed by authorized personnel only.

## GOVERNING LEGISLATION

This device complies in conformity with the requirements of the following normative harmonized standards: EN 61326:1997 (A1:1998, A2:2001). EMC requirements for electrical equipment for measurement, control and laboratory use. EN 61010-1:2001 Safety requirements for electrical equipment for measurements, control and laboratory use following the provisions of EC Directive(s). 89/336/EEC Electromagnetic Compatibility (EMC-Directive). 73/23/EEC Low Voltage Directive (LVD).

## AUTOFLEX III MALDI

### HAZARDS

- Exposure to Laser Light

**RISK ASSESSMENT**      **Low**

### CONTROL MEASURES

- The MALDI is a piece of electrical equipment for measurement, control, and laboratory use where the electromagnetic environment is kept under control. That means in such an environment transmitting devices such as mobile phones should not be used in the immediate vicinity.
- The MALDI with the closed safety cover is a Class I Laser product. With the safety cover opened it turns into a Class IV Laser product emitting 355 nm light. The enclosure surrounding the instrument is designed to protect the user from indirect radiation of the invisible light. Operating the instrument with opened covers can expose the user to harmful laser radiation, which may result in blindness.
- Never look directly into the laser beam. Always wear safety goggles before opening the side panels. Make sure other people cannot expose themselves to the laser light. Avoid bringing highly reflecting parts into the beam (screw drivers, watches, rings) because the reflected visible and invisible light could reach your eye, causing irreparable injuries!
- Appropriate training in the correct use of the equipment will be provided by trained personnel prior to use.
- Do not deviate from published operating procedures. Ensure the safety cover is closed at all times. Service and planned maintenance should be performed by authorized personnel only.

## **GOVERNING LEGISLATION**

This device complies with the requirements of both directive 89/336/EEC concerning electromagnetic compatibility and directive 73/23/EEC concerning low voltage. The CE marking indicates compliance with the above directives. Laser Safety 1EC60825-1:1 993+A1:1 997+ A2:2001

## ***NMR SPECTROMETER***

NMR facilities at TU Dublin – Tallaght Campus consist of magnet/sample preparation room, data handling room and staff office.

NMR spectrometers are highly sophisticated and sensitive devices, and hence all the users must work cautiously around the NMR laboratory. Failure to do so can result in costly instrument damage and serious personal injuries which could be fatal. Each user must understand the hazards present in the laboratory and follow all the safety practices.

The superconducting magnets attached to the electronic equipments are always on and active. These magnets have very strong static magnetic fields, 300 MHz (70,000 Gauss), 500 MHz (117,000 Gauss) when compared to the earth's magnetic field (0.6 Gauss at equator). The strength of the magnet falls off as you move away from its centre.

NMR facilities, and in particular the magnet/sample preparation room are accessible only to authorised personnel. All the NMR users including postgraduate and especially undergraduate students will have to undertake pre-work training programme prior to being allowed to use the NMR facilities. The use of NMR facilities by undergraduate students must be supervised at all times by NMR staff. Compliance with Good Laboratory Practice is mandatory. No children (babies included) are allowed to enter the NMR labs. All service personnel and visitors must gain permission to access the NMR facility by contacting the NMR Manager.

## **HAZARDS**

- UltraShield superconducting magnets
- Cryogenic liquids

**RISK ASSESSMENT**      **Medium**

## CONTROL MEASURES

- Warning signs are placed at both entrances to the NMR facility. The strong magnetic field can cause damage to medical implants and pacemakers which could be fatal. Do not enter to the NMR facility if you have any medical implants or pacemakers.
- Strong magnetic fields can cause damage to personal electronic items (mechanical watches, plastic cards with magnetic strips, mobile phones, metal jewelry etc). These items should not be in a close proximity to the magnets.
- Strong magnetic fields can attract metal objects which could cause damage to the magnet and cause personal injuries. No DIY tools, metallic objects or portable electronic equipment should be taken closer than 1.5 m to the magnets. Metal objects can be attracted to the magnet. Small, sharp metal objects flying towards the magnet are highly dangerous and can cause personal injury. Larger objects are troublesome to scrape off the magnet, and can seriously damage the magnet. If the objects strike the magnet they can distort magnet's internal structure which can cause the magnet to release its cryogenic liquids in gas form (quench), especially liquid helium.
- In the unlikely event of the magnet quenching or of a cryogenic failure, up to 100 m<sup>3</sup> of helium gas may evolve over a period of several minutes. In this situation liquid helium expands rapidly and displaces all the air (oxygen) in the room causing asphyxiation. Personnel should evacuate the area in such situation.
- A quench warranting evacuation would be obvious by the noise of escaping gas and clouds of vapour.
- The liquid helium (-269<sup>o</sup> C) and liquid nitrogen (-196<sup>o</sup> C) used in the magnets are extremely cold. Prolonged contact with liquid nitrogen or brief contact with liquid helium will cause frostbite. Therefore PPE – cryogenic gloves, safety glasses and safety footwear must be worn all the time. If these cryogenic liquids do come into contact with the skin, use warm water (below 40°C) and never use dry heat. All incidents must be reported.
- Filling of the magnet with liquid nitrogen and with liquid helium is necessary to maintain the magnet. Failure to refill the magnet when low levels occur may result in a magnet quench.
- The liquid nitrogen refill of both magnets should be done on a weekly basis. The liquid helium level for each spectrometer is monitored by automatic sensor and helium log files are accessible from the NMR computers. The level of the liquid helium cannot be lower than 55 % for each magnet.
- Both cryogen refills should be done by trained personnel only. PPE and safety footwear must be worn during the cryogen refill. Doors should be propped open to increase ventilation during the cryogen refill. Since the possibility of a helium quench is higher when filling the magnet, and since the transfer involves manual operations, there is a remote possibility that an operator could be rendered unconscious at the

time of a quench. Transfer must be continuously attended and helium transfer must be done in buddy pairs and by trained personnel only.

- In the event of fire in the NMR facilities use only carbon dioxide fire extinguishers. The fire extinguisher is placed at the wall in the magnet/sample preparation room, left to the entrance.
- In case of serious flooding or other situations where there is a risk of electrocution, turn off the equipment circuit breakers. These are located at the wall in the magnet/sample preparation room, left to the window.

### ***LC-MS SPECTROMETER***

The Agilent LC-MS system (6200 Series TOF and 6500 Series Q-TOF) is a liquid chromatograph which separates out sample matrices into their individual chemical components, and each component is sent to a Q-TOF mass spectrometer, that produces spectral data using a time-of-flight unit, and also provides accurate mass determinations, following ionization of the components using jet stream electrospray ionization technology that uses gas sources under vacuum conditions.

### **HAZARDS**

- General Instrument Safety: PHYSICAL INJURY HAZARD: Use the LC/MS instrument only as specified in the user instructions. Using the system in a manner not specified by Agilent Technologies can result in personal injury or damage to the instrument.
- Moving or lifting the system: The LC/MS instrument is heavy. The 6200 and 6500 series LC/MS instruments require at least four people.

**RISK ASSESSMENT**      **Low**

### **CONTROL MEASURES**

- The LC-MS system is an electrical piece of equipment for measurement, control, and laboratory use.
- Operating the instrument: Before you operate the instrument, make sure that you have: been given instructions on general safety practices for laboratory and specific safety practices for the instrument.
- All operators must have read and understood all material safety data sheets (MSDS) for chemicals handled and be sure that they are compatible for use with the LC-MS system.
- Appropriate training in the correct use of the equipment will be provided by trained personnel prior to use.

- Do not deviate from published operating procedures. Ensure the safety cover is closed at all times. Service and planned maintenance should be performed by authorized personnel only.

### **GOVERNING LEGISLATION**

The Agilent 6000 Series LC/MS meets the following IEC (International Electro-technical Commission) classifications:

- Equipment Class: I (Laboratory Equipment)
- Installation Category: II
- Pollution Degree: 2

This unit has been designed and tested in accordance with recognized safety standards and is designed for use indoors. If the instrument is used in a manner not specified by Agilent Technologies, the protections provided by the instrument may be impaired.

### **Environmental Conditions**

- Equipment Class Class I Laboratory Equipment
- Pollution Degree 2
- Installation Category II
- Environment Indoor Use
- Altitude Not to exceed 3000 m
- Electrical supply 200 - 240 V AC, 50/60 Hz, maximum 2850 VA
- Mains supply voltage Fluctuations not to exceed 10% of nominal supply voltage
- Operating Temperature 15 to 35°C (59 to 95°F)
- Humidity < 85% RH at 35°C



## G2. CASH Class II Microbiology Laboratory Equipment

The equipment in a Class II Microbiology Laboratory must be installed, operated and subsequently decontaminated before removal from the laboratory. While the equipment is not a source of hazard, some of the components may become contaminated and therefore specific procedures should be followed and protocols followed, and so the risk category would be regards as high.

### EQUIPMENT FOLDER LAYOUT

1. EQUIPMENT LOG:
  - a. Table of contents
  - b. Inventory
2. MAINTENANCE SCHEDULES
  - a. Unscheduled
  - b. Scheduled
3. EQUIPMENT DECONTAMINATION PROCEDURES
4. TECHNICALS DOCUMENTS: (Technical documents listed below are provided for each piece of equipment and are located in the respective equipment folder)
  - a. Maintenance/operation instructions SOPs
  - b. Manufacturer's manuals
  - c. Calibration certificates
5. INSTRUMENT LABELS:
  - a. Instrument details and maintenance schedules
  - b. Maintenance/calibration record label (if required)

### **1. EQUIPMENT POLICY**

The laboratory ensures the accuracy and safety of equipment used in the performance of specific laboratory activities. It implements processes and procedures for the provision and operation of laboratory equipment. Authorized personnel are selected for the purchase and calibration, maintenance service and retirement of equipment. It is the duty of all laboratory staff to adhere to the instructions and procedures that describe equipment usage and maintenance.

## **2. EQUIPMENT AVAILABILITY**

The laboratory maintains an inventory of all the equipment and instruments available. The inventory is available as hard copy (Appendix - Equipment Log / Inventory) and in the form of an electronic database. Each item is identified with a unique number. The inventory also includes other information such as description of the item (name, brand, model and serial number), its location, and location of its documentation, supplier, and contact details for servicing, first use and retired dates.

## **3. COMMISSIONING OF NEW EQUIPMENT AND OPERATION**

Authorized and key personal ensures that all equipment used in the laboratory meets the accuracy requirements and specifications required before it is placed in service (Fig. 1). After the purchase of new equipment, authorized personnel are trained in the operation of the equipment. New equipment is validated in collaboration with the equipment supplier and /or instruction manual to check conformity with appropriate performance standards. All records arising from validation experiments are stored in the corresponding instruments folder. A new internal ID number is assigned to the new instrument, the equipment log (Appendix - Equipment Log / Inventory) is updated and the instrument is labeled. The schedules for maintenance are arranged and if required a new SOP is also prepared. Ensure that all personnel have received adequate training and retraining if necessary in the use of the equipment and that up- to-date instruction on the use and maintenance of the equipment (SOPs), including any relevant documentation provided by the manufactures are readily available in the instrument folder. Instrument folders are kept in the laboratory (Appendix - Equipment Log / Table of contents).

Abbreviated operation and maintenance / calibration instructions in the form of SOPs are also available for some of the equipment (see SOP Section G.1 to SOP G.....). These instructions are laminated and are pinned to the wall adjacent to the relevant piece of equipment. A folder is also kept next to the equipment containing other information such as maintenance schedules and maintenance and operating logs.

## **4. EQUIPMENT MAINTENANCE AND CALIBRATION**

Maintenance and calibration of equipment is extremely important to ensure accurate and reproducible results. The laboratory has established procedures and instructions for the general maintenance of all laboratory equipment. Maintenance requirements and frequency are defined for each piece of equipment and are described in schedule (SOP – G.2 Maintenance and Calibration Schedule). Briefly the process is as follow for equipment that requires external maintenance, preventive maintenance is arranged with a service agent and for the equipment that requires internal maintenance, and the maintenance is performed as scheduled.

Any maintenance that is carried out is recorded in the maintenance log section of the individual folder for that piece of equipment and the due date for the next calibration is indicated (SOP – G.1 Maintenance Record Form).

### **5. EQUIPMENT TRANSPORT / STORAGE**

If any equipment requires relocation or storage (if, for example it is taken out of service for a considerable time), the transport or storage of such equipment must proceed as described in the manufacture's manual. For equipment that has been moved outside the laboratory, that has been relocated or that has been in storage, the laboratory must demonstrate that it is in calibration and functioning properly before returning it into service. An authorized technician conducts the examination of such equipment following instruction given in the relevant operating manuals. If no malfunction is reported and the inspection is satisfactory, then its maintenance records are updated. On the other hand, if a malfunction is reported, the item is to be labeled as "out of service", decontaminated (if required) and sent for repair (SOP G.2 - Equipment Decontamination Procedure). If the instrument requires external recalibration, the proper service for the instrument is arranged with the service agent or supplier.

### **6. EQUIPMENT RETIREMENT**

Equipment that has suffered damage and cannot be repaired must be disposed of. The process that the laboratory follows for Equipment disposal is as follows:

- If the equipment requires decontamination, the decontamination of such equipment is performed as described in SOP G.2 - Decontamination procedure). Depending of the type of equipment, decontamination will be carried out in-house or by a contractor. Subsequently the equipment is labeled as decontaminated and decontamination forms signed (Form G.3 - Decontamination Certificate or the company decontamination certificate (if supplied))
- Disposal is arranged with the supplier
- The equipment is disposed of.

## Section H. Chemical Storage and Waste Disposal

### H1. Chemical Storage:

1. All chemicals are to be stored in **flammable cabinets** and **corrosive blue cabinets**, which are placed in laboratories.
2. **Solvents** and any chemicals in liquid form are **stored separately** from chemicals in **dry/powder form**.
3. Acid/alkali solutions are to be stores in **corrosive cabinets**.
4. Refer to the **Safe Chemical Storage Guideline** available in the laboratory.

#### SPECIAL STORAGE REQUIREMENTS OF CHEMICALS

- **Explosives:** Explosive compounds should be locked in a secure separate store. Production of explosive powders should be avoided and contained.
- **Moisture Sensitive Materials:** Large quantities may be stored externally if they are well sealed, smaller quantities should be stored internally in a desiccator in the store out of direct sunlight preferably in a locked press. The desiccant should be checked regularly.
- **Temperature Sensitive Materials:** Substances that are unstable at ambient temperatures should be stored in a spark-proof fridge or cold-room. These should not be stored in the external store.
- **Air Sensitive Materials:** Only large quantities should be stored externally, as per supplier's specifications, small quantities should be stored internally.
- **Flammable Materials:** Flammable solvents must be stored in a laboratory in approved fire-resistant storage cabinets, sited as far away from sources of ignition as possible. Reduce to the absolute minimum the quantities of flammable and /or toxic solvents used in chemical operations or held in temporary storage. Flammable solvents should be stored so as not to obstruct doorways, passages or escape routes. Flammable liquids should be stored only in specially modified refrigerators. Ordinary domestic type "fridges" should not be located in areas where flammable liquids may be used. as ignition and fire may occur from the normal sparking of ordinary switches and devices in such units.

## PHYSIOCHEMICAL HAZARDS ASSOCIATED WITH CHEMICALS

### Irritants and Sensitizers:

- When sensitizers are in use in the laboratory, the user must inform all their co-workers of their presence and ensure that no co-workers are sensitised to the agent in question.
- Respiratory sensitizers should be used in the fume hood.
- When using skin sensitisers appropriate PPE should be worn to prevent direct skin contact.

### Toxic Chemicals:

- Very toxic agents must be weighed out in a weigh safe cabinet.
- Suitable PPE must be worn, including disposable gloves which are impermeable to the toxic agent. Contaminated gloves must be removed immediately and disposed of. Contaminated lab coats should be removed, decontaminated appropriately if necessary and laundered.
- Very toxic chemicals should be stored in a locked cabinet when not in use.

### Carcinogens, Mutagens, Teratogens:

- Wherever possible, these agents should be replaced with less harmful compounds. Otherwise the amounts used should be as low as possible.
- The number of persons exposed should be as few as possible.
- Processes should be designed to prevent the generation of dusts, fumes and vapours. Very toxic agents must be weighed out in a weigh safe cabinet.
- Areas of use should be demarcated if possible, with suitable signage.
- These agents should be stored in a locked cabinet when not in use.

### Corrosive Chemicals:

- It should be assumed that corrosive liquids are incompatible with other corrosive materials. Acids and bases, in particular, should be stored separately.
- Fuming acids must always be used in a fume hood.
- All equipment which comes into contact with a corrosive material, such as storage containers, reaction vessels and spill trays, must be resistant to that material.

**Flammable Chemicals:**

- All naked flames in the whole laboratory should be extinguished when handling them.
- Care should be taken when using electrical equipment in the vicinity of flammable substances as sparks from electrical equipment may ignite flammable substances.
- The same precaution must also be applied to oxidizing substances as they may also be flammable.

**Explosives:**

- Always use small quantities and work behind a protective screen.
- Care must be taken when mixing two harmless compounds as the resultant compound may be explosive.

**H2. Chemical Waste Disposal:**

1. All solvent wastes are to be labeled properly and stored in the Chemical Waste Room on the ground floor.
2. Refer to the **Safe Chemical Waste Management Guideline** available in the laboratory.
3. Different solvents cannot be mixed in the same bottle. Improper solvent mixing may lead to fire or explosion.
4. Ethidium bromide is not allowed in the Research Lab.
5. The contracted company responsible for waste disposal will be called to remove the wastes at fixed period.

**CHEMICAL WASTE DISPOSAL**

Waste and excess must be disposed of quickly to avoid accumulation of large stocks. Fastened White coats and safety glasses or goggles must be worn at all times when dealing with all categories of waste. Full breathing apparatus must be used when emptying waste receptacles into the Intermediate Bulk Containers (IBCs) in the bunded area and the procedure is always performed in pairs. It is important to appreciate that chemicals of an oxidizing, flammable, explosive, toxic, carcinogenic or harmful nature remain so even when they are considered as waste. The waste material is at least as hazardous as the sum of its components.

**Waste Minimization:**

- Common chemical waste minimization techniques include:
- Chemical redistribution and recycling – Unopened or unused portions of chemicals may be redistributed within the Institute.
- End of Process Treatment – End of process treatment procedures should be used where practicable. Non-hazardous acids and bases may be neutralized to pH 6-9 and flushed down the drain. Many water-based chemical compounds may be diluted and flushed down the drain. However, environmental considerations must be taken into account, especially regarding nitrates and phosphates.
- Management – Audit of chemical supplies and use of inventory control.
- Purchasing – Only the required quantity of chemicals should be purchased, particularly so with “problem” chemicals. Chemicals should not be stockpiled unnecessarily.
- Process Modification – To the extent that it does not compromise vital research, teaching or service, laboratories are encouraged to modify experimental or standard processes to decrease the quantity of hazardous chemicals used and generated. Where possible, micro or semi-micro techniques should be used to reduce the amount of waste generated.
- Product Substitution – Substitution of non-hazardous or less toxic materials in chemical processes and experiments.
- Segregation and Characterisation – Chemical wastes should be accurately labelled. Mixtures of chemical wastes should be labelled as accurately as possible, giving the percentage composition of the various component chemicals. Incompatible chemical wastes should not be combined.
- Training – Training in waste minimization techniques should be given.

**Disposal**

- The same handling, use and storage controls apply to chemical wastes as apply to chemical agents in use in the laboratory.
- Hazardous chemical waste, which cannot be rendered harmless to persons or the environment on site, must be labelled accurately, and stored in the fumehoods using the appropriate waste receptacle.
- Liquid waste is segregated into inorganic, non-halogenated and halogenated waste and each of these has its own waste receptacle located in the various fumehoods. The fumehood must be turned on and the screen pulled down as far as practicable when emptying waste into these receptacles.



- Organic wastes should be emptied into labelled containers, and stored in the fumehood until they are transferred to the IBC in the Science yard. Liquid waste containers should be removed and replaced when 80% full and safely stored for disposal.
- All persons involved in emptying waste receptacles into IBCs must work in pairs and wear full PPE including full breathing apparatus, gloves and white coat.
- Chemicals which may cause harmful environmental effects, either to plant or animal life must not be discharged to the foul sewer and must be treated as hazardous waste. Compounds that lead to eutrophication of watercourses, such as nitrates or phosphates, must also be treated as hazardous waste.
- Water based compounds can be diluted and discharged to the foul sewer (except nitrates and phosphates). Common buffer salts may be diluted with copious amounts of water and discharged to the foul sewer.
- Acids and bases should be neutralized to the pH range 6-9 before discharge to the foul sewer.
- Enzymes or catalysts, biological waste, DNA material, mutagenic or carcinogenic waste is classified as hazardous.
- All dyes must be treated as hazardous.
- Explosives should be separated from the main waste. Not all explosives will be removed, and are accepted on a case-by-case basis.

### Governing Legislation

- [Waste Management \(Hazardous Waste\) Regulations 1998 and Amendment 2000.](#)
- *Environmental Protection Agency Act 1992.*
- *Waste Management Act 1996.*
- *Waste Management (Amendment) Act 2001.*
- *Protection of the Environment Act 2003.*
- *Waste Management (Waste Electrical and Electronic Equipment) Regulations 2005.*
- [European Communities Waste Directives.](#)

### H3. Biological Waste Disposal

1. **Bacterial and cell culture dishes, plates and flasks** are to be disposed into **Autoclave Bags** and decontaminated before disposal.
2. All other **biological wastes** should be disposed in **Biohazard Bags** (yellow bags) and kept in a **Biohazard Bin** (yellow bin).
3. Gloves used in handling of biological works are to be disposed of in a **Biohazard Bags**.
4. Dissecting steel blades for cutting tissues and contaminated broken glassware are to be disposed in a **Sharp Objects Bin (yellow)**.
5. Refer to the **Safe Biological Waste Management Guideline** available in the laboratory.
6. For Class 2 waste, please refer to the relevant section of the **Biosafety Manual & Appendix** available in the Laboratory.

Solid waste with biological agents (including agar plates, paper and gloves used with infectious and other hazardous materials) are disposed of in a double autoclave bag located in appropriate floor stands within Biology laboratories. When three-quarters full, the bags are sealed, rendered safe by autoclaving and placed in a yellow UN3291 autoclavable biohazard bags. These bags are sealed and placed within a sealed liner inside the yellow and grey wheeled bins. The inner liner is sealed when the wheeled bin is full and the outer bin lock is fastened. These wheeled bins are stored in the outside Science yard prior to being sent to a licensed agent for disposal. Bags of waste are not to be stored in laboratories as they are a fire hazard and a trip hazard.

#### Disposal and Disinfection

Dry waste material is autoclaved and placed into Biohazard bags that are then sealed and are moved off-site by an approved contractor for decontamination and disposal as detailed in the SOP of Infection Control Policy for Management of Bio-hazardous Waste found in the Laboratory Biosafety Manual. The waste is routed for treatment through Eco-Safe Systems, Unit 1A Allied Industrial Estate, Kylemore Road, Dublin 10, approved under E.P.A. Licence 54/2, in accordance with the Waste Management Act, 1996 and Waste Management (Licensing) Regulations 2004. Non-autoclaved laboratory wastes are included. Wastes not suitable for treatment are exported from the transfer station for incineration. The movement of hazardous waste from the Institute is recorded and controlled by the use of C1 forms under the Waste Management (Hazardous Waste) Regulations 1998 and Amendment 2000. A Certificate of Acceptance and Destruction of Clinical Waste /Healthcare Risk Waste is received from Eco-Safe Systems and is held on file.

All potentially pathogen-containing liquid waste should be collected in containers and treated with an appropriate disinfectant (See Laboratory Biosafety Manual) or autoclaved before being flushed down the sink with plenty of water.

#### **Genetically Modified Organisms (GMO) Waste**

Class 1 & 2 GMO waste is treated as biological waste and all waste material must be autoclaved on site prior to disposal by a licensed waste disposal agent. Please use the approved methods as set out in the **Biosafety Manual & Appendix** only.

## **H4. Disposal of Other Laboratory Wastes**

1. Broken glass is to be disposed in the **Sharp Objects Bin (yellow)**.
2. Tips, tubes, parafilm and gloves used in handling biological materials are to be disposed in **Autoclave Bags**.
3. Tips, tubes, parafilm and gloves (except gloves used in handling biological materials) are to be disposed in **Waste Disposal Bags**.
4. Domestic waste e.g. paper, wrapping materials, etc. are to be disposed on in household waste bins.

### **GENERAL WASTE**

#### **Hazards**

- Fire due to combustible materials
- Trips and falls from improper storage of waste on walkways, escape routes etc.

**Risk Assessment:**        **Low**

#### **Control Measures**

- The cleaning staff must empty waste bins, recycled paper boxes and the cardboard boxes for recycling on a regular basis.
- Items of hazardous waste must not be put into general waste bins.
- General waste should not be included with hazardous waste.
- Suitable PPE should be worn when handling waste.

- Waste electrical and electronic equipment shall be placed in designated areas for collection and recycling by a licensed company.
- Students must be trained in the use of the various different waste receptacles within the laboratory.
- An effort should be made to minimize the amount of general waste generated and accumulated at the Institute. Good housekeeping practices should be encouraged e.g. disposal of old catalogues as soon as new ones become available, the use of computer based catalogues instead of paper copies, etc.

### **Solid Waste**

Non-hazardous chemical waste in solid form can generally be double-bagged and placed in the normal waste bins or water can be added and they can be flushed to drain with copious amounts of water.

Solid hazardous waste with chemical agents shall be collected in UN3291 bulk containers with purple lids to indicate that the solid waste is cytotoxic. Sharps such as broken glassware contaminated with chemical residues should not be placed in the bulk containers as they are not suitable. These cytotoxic bulk containers are placed within a sealed liner inside the red wheeled bins in the Biology Department. The inner liner is sealed when the bin is full and the outer bin lock is fastened. These are then stored in the outside Science yard prior to being sent to a licensed agent for disposal. In the Chemistry department these bulk containers are stored outside on a pallet prior to being sent to a licensed agent for disposal.

### **Sharps Waste**

Every effort should be made to minimize the use of items that result in a sharps hazard in the Institute e.g. substitution of plastic Pasteur pipettes for glass ones should be encouraged. Only "sharps" material should be placed in "sharps" containers. Broken glassware should also be considered as sharps waste. Rubber gloves, paper tissue and other miscellaneous non-sharps waste should not.

Sharps should be disposed of in designated UN3291 sharps containers. If they contain chemical residues the waste is placed in a sharps bin with a purple bin. Glassware or needles / syringes contaminated with bio-hazardous material are placed in a sharps bin with a yellow lid. Purple sharps bins are placed within a sealed liner inside the red wheeled bins in the Biology Department. Yellow sharps bins are placed within a sealed liner inside the yellow and grey wheeled bins. The inner liner is sealed when the wheeled bin is full and the outer bin lock is fastened. These wheeled bins are stored in the outside Science yard prior to being sent to a licensed agent for disposal. In the Chemistry department these sharp containers are stored outside on a pallet prior to being sent to a licensed agent for disposal.

**Hazard**

- Potential to cause cuts and infections, especially to cleaning staff.

**Risk Assessment      High****Control Measures**

- Waste “sharps” should not be placed in ordinary waste bins.
- The special sharps boxes provided should be used. Do not overfill, and seal when full. When filled and sealed, the sharps bin should be removed promptly to either the appropriate wheeled bin or the Science yard on a pallet prior to collection.
- Used blades and hypodermic needles should be promptly disposed of after use. They must not be left out on bench and needles must never be re-sheathed.
- Broken glass should be swept up and disposed of in a sharps box. The surrounding work area and adjoining floor should be checked for fragments.

## Appendix 1: Safety, Health and Welfare at Work Act 2005 - Duties of Employees

Sections 13 and 14 of the 2005 Act (which replaces section 9 of the 1989 Act) place a number of obligations on employees and others while at work.

Section 13 states that the employee must:

- a) Comply with the relevant statutory provisions, as appropriate, and take reasonable care to protect his or her safety, health and welfare and the safety, health and welfare of any other person who may be affected by the employee's acts or omissions at work,
- b) Ensure that he or she is not under the influence of an intoxicant to the extent that he or she is in such a state as to endanger his or her own safety, health or welfare at work or that of any other person,
- c) If reasonably required by his or her employer, submit to any appropriate, reasonable and proportionate tests by, or under the supervision of, a registered practitioner who is a competent person as may be prescribed,
- d) Co-operate with his or her employer or any other person so far as is necessary to enable his or her employer or the other person to comply with the relevant statutory provisions, as appropriate,
- e) Not engage in improper conduct or other behaviour that is likely to endanger his or her own safety, health and welfare at work or that of any other person,
- f) Attend such training as may be reasonably be required by his or her employer or as may be prescribed relating to safety, health and welfare at work or relating to the work carried out by the employee,
- g) Having regard to his or her training and the instructions given by his or her employer, make correct use of any article or substance provided for use by the employee at work or for the protection of his or her safety, health and welfare at work, including protective clothing and equipment,
- h) Report to his or her employer or to any or to any appropriate person, as soon as practicable –
  - (i) Any work being carried on or likely to be carried on, in a manner which may endanger the safety, health or welfare at work of the employee or that of any other person,
  - (ii) Any defect in the place of work, the systems of work, any article or substance which might endanger the safety, health or welfare at work of the employee or that of any other person, or
  - (iii) Any contravention of the relevant statutory provisions which may endanger the safety, health and welfare at work of the employee or that of any other person of which he or she is aware.

## Appendix 2: Agreement on Holding of Keys to the Research Laboratories

### Researcher's Declaration

I, the undersigned,

Name: *print name*] \_\_\_\_\_ ID number/position \_\_\_\_\_

agree to fully abide by the rules and regulations as stated in the laboratory guidelines failing which the Institute of Technology Tallaght holds the right to penalize me.

I agree to keep the keys in a safe place, and hold full responsibility on lab equipment and consumables.

I agree to obey decisions from the College to bear the cost of damages/loss of the laboratory equipment as a result of my own negligence.

I will not duplicate the keys to the C.A.S.H. and/or Associated Research Laboratories and/or other areas for which I granted access, and I will keep the main door to the lab locked at all the time.

I will report to the security personnel and lab officers any hazards, damages or missing properties in the laboratory.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### Supervisor's Recommendation

I, [*print name*] \_\_\_\_\_ acknowledge the capability of the student / researcher signed above to hold keys to the main doors of the CASH/Synergy Building, ITT Dublin and/or Associated Research Laboratories and/or other areas for which s/he is granted access. I also understand that the applicant shall hold full responsibility of liability as declared above.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



## Appendix 3: Access to the CASH Building for TU Dublin and for New and Visiting Researchers

The Centre of Applied Science for Health at TU Dublin seeks to provide a safe and secure work environment for all building users. Access to the laboratories and facilities available in the C.A.S.H. building is controlled in the interest of ensuring the safety of all persons using the building. C.A.S.H. welcomes visitors and where appropriate will seek to accommodate visiting researchers. In particular, C.A.S.H. welcomes and facilitates appropriate collaborations with other research groups / HEI's and exchange visits between such groups for the purpose of deepening collaborations, the exchange of knowledge, and the furtherance of research efforts.

### 1. TU Dublin New Researchers

- a) When recruiting new researchers, academic supervisors / lead PI(s) must notify the Research Office in advance of the date of arrival of the new researcher. Include details of the status of the researcher (e.g. postgraduate, post-doctoral fellow etc.), facilities they require access to, requirements for a desk, PC, email services etc. Where possible, the research office will try to locate the researcher as close to the require facilities as possible.
- b) New postgraduate students will be required to undertake an induction programme that includes Safety Awareness training.

### 2. Visiting Researchers

- a) Before inviting a visiting researcher to work in the C.A.S.H. building, academic supervisors / lead PI(s) must notify the Research Office in advance of the date of arrival of the visiting researcher. Include details of the status of the researcher (e.g. postgraduate, post-doctoral fellow etc.), facilities they require access to, requirements for a desk, PC, email services etc. using the form below.
- b) Where possible, the research office will try to locate the visiting researcher as close to the required facilities as possible.
- c) Before work is commenced, the academic supervisors / lead PI(s) must ensure visiting researchers are fully briefed on Health & Safety requirements and provided with any specific safety training required for the particular work to be performed during the visit.

## VISITING RESEARCHER ACCESS REQUEST FORM

To be completed in full by the inviting Academic Supervisor / Lead PI and the visiting researcher.

|   |                                 |   |                 |
|---|---------------------------------|---|-----------------|
| <b>Name of Visiting Researcher (<i>print</i>):</b>  |                                 | Email:  |                 |
| <b>Home institution of the visiting researcher:</b>   |                                 | Tel:  |                 |
| <b>ITT Dublin Supervisor's /PI Name (<i>print</i>):</b>   |                                 | Ext:  |                 |
| Specific lab location for proposed work:  |                                 |   |                 |
| Period of the proposed visit:   |                                 | From:   | To:             |
| Facilities required:  | Desk:                           | PC:   | Email: Other:   |
| Brief description of work ( <i>for the general reader - use continuation sheet if needed</i> ):                     |                                 |   |                 |
| <b>Does the visiting researcher have appropriate insurances in place for the duration of the visit:</b>             |                                 |   |                 |
| Yes*:   | No:                             | *To be signed by the Relevant Head of Function at the visiting researchers home institution |                 |
| <b>Signature:</b>   |                                 |   | Date:           |
| <b>Are there any specific Safety requirements associated with the proposed work: (<i>tick appropriate box</i>):</b> |                                 |   |                 |
| Yes*:   | Risk Assessment completed       | No additional risk identified:  |                 |
| If 'YES', state what these are and the controls being put in place.   |                                 |   |                 |
| <b>Has this work received ethics clearance: (<i>tick appropriate box</i>):</b>                                      |                                 |   |                 |
| Yes*:   | Awaiting decision:              | Clearance denied:   | Not applicable: |
| If 'YES', state where, by whom and decision date. Attach a copy of the decision.                                    |                                 |   |                 |
| <b>Project financing: Funding source (<i>include project code if available</i>):</b>                                |                                 |   |                 |
| Is a separate project code required?  | Budget allocation:              |   |                 |
| <b>Research Office Approval (<i>tick one</i>):</b>  | Yes                             | No:   | Date:           |
| If 'No' state why:  |                                 |   |                 |
| <b>Signatures:</b>  | <b>Supervisor / PI:</b>         | Date:   |                 |
| <b>Signatures:</b>  | <b>For the Research Office:</b> | Date:   |                 |

## Appendix 4: Post-Graduate/Researcher Overnight Experiment Form

Centre of Applied Science for Health, TU Dublin

|   |                        |          |
|---|------------------------|----------|
| Laboratory:   |                        |          |
| Researcher's Name <sup>2</sup> :  |                        |          |
| Contact numbers (in case of Emergency):   | Daytime:               | Evening: |
| Time and Date started:  | Estimated Finish Date: |          |
| Supervisor's Name:  |                        |          |
| Supervisor's Contact numbers:   | Daytime:               | Evening: |
| <p>Full Description of experiment <b>in plain English</b>. (Include full names of all chemicals/solvents used. Do not use any acronyms (e.g. DCM, THF, etc.). Draw the full reaction scheme (where applicable).</p> |                        |          |
| <p>Procedure in the event of an emergency (Use NON-TECHNCIAL Plain English):</p>  |                        |          |

**This form must be left beside your reaction.**

**A copy should also be given to security.**

**Failure to fill out the form in full will result in your reaction being switched off.**

**Class / Project Supervisor:** \_\_\_\_\_ **Date:** \_\_\_\_\_

<sup>2</sup> In the case of undergraduate students, contact numbers should be given for the project / laboratory supervisor only. Undergraduate students would not be deemed to have sufficient knowledge to deal with an uncontrolled reaction.

## Appendix 5: Application for Use of the Research Labs Out of Normal Office Hours

See TU Dublin - Tallaght Campus Standard Operating Procedure DR042 - After Hours Access to the Institute for Staff and Postgraduate Students [http://193.1.120.60/old\\_intranet/staff/sops/pages/estates.htm](http://193.1.120.60/old_intranet/staff/sops/pages/estates.htm)

### POLICY

TU Dublin – Tallaght Campus wishes to allow staff and post-graduate students to access the building outside the normal opening hours of the Institute which are as follows (*times may be change as the institute requires*):

|                          |                   |               |
|--------------------------|-------------------|---------------|
| <b>During Semester:</b>  | Monday – Thursday | 08:00 – 22:00 |
|                          | Friday            | 08:00 – 19:00 |
|                          | Saturday          | 08:00 – 14.30 |
| <b>Outside Semester:</b> | Monday – Friday   | 08:00 – 18:00 |
|                          | Saturday          | 08:00 – 13:00 |

Researchers and post-graduate students can obtain access to the building outside the above times; however they must leave the campus before 22:00 on Friday and Saturday.

### Access on Sunday and Bank Holidays can be obtained between the hours of 08:00 – 22:00.

- 1) The *Out of Hours Access Form* is completed and signed by the researcher and the relevant supervisor or Head of Department/School. They must be satisfied that the work is safe to perform alone.
- 2) Give copies of the signed form to the Assistant Estates Manger/Estates Manager for signing at least 24 hours in advance of the required access time. The time at which the out-of-hours access is required is recorded the office diary to inform security staff of the proposed access.
  - a) Where access is required for the main building or Icon Court only, the Assistant Estates Manger/Estates Manager will provide a key for the main campus gate. Access to the main building will be provided by Security on arrival.
  - b) Where access is required for the CASH-Synergy Building, a copy of the signed form should be given to the Research Admin Office to secure keys to the building and the main campus gate, and an alarm code for the building. Keys must be 'signed out'.
- 3) On arrival at campus, open the gate and close and lock it behind you.
  - a) If going to the main campus building, security will provide access and you must sign-in with your name and time of entry in the diary provided at reception. Inform security of the area(s) of the

building where you will be working; this is to ensure that only the minimum number of alarmed areas within the building is turned off.

- b) If going to the CASH-Synergy building, use the key provided at 2b to enter the building, lock the door and deactivate the alarm. Call security at 087-679-1876 and advise them that you are in the building. Leave your name and a mobile number should they need to call you. Write your name and time of arrival in the visitor's book at reception.
- 4) When leaving,
    - a) The main building, (i) inform security, (ii) 'sign out', and (iii) leave.
    - b) When leaving CASH-Synergy, (i) call security to say you are finished, (ii) 'sign out', (iii) reset the building alarm if you are the last person to leave, and (iv) lock the door behind you.
  - 5) As you leave the campus, close and lock the campus gates behind you.
  - 6) Gate keys must be returned to the Building Services Office and 'sign in' when next in the institute. Return CASH-Synergy keys to the Research Office and 'sign in' when next in the institute.
  - 7) All persons should have regard to their own security and personal safety when entering or leaving the campus outside of the normal opening hours.



## OUT OF HOURS ACCESS REQUEST FORM

To be completed in full by the Academic Supervisor for each Postgraduate Student or Researcher requiring Lone / Out of Hours Access in the CASH-Synergy Research Innovation building .

Out-of-hours work during the academic year is defined as laboratory/experimental work undertaken outside of the hours of 08.00 to 21.00 Monday to Thursday inclusive, 08.00 to 18.00 on Fridays, and 08.00 to 14.30 on Saturdays. Outside of the academic year, out-of-hours is defined as work outside of the hours of 09.00 to 18.00 Monday to Friday inclusive.

|  |              |               |                                   |
|--|--------------|---------------|-----------------------------------|
| Name of Researcher ( <i>print</i> ):   |              | Telephone:    |                                   |
| Supervisor's Name ( <i>print</i> ):  |              | Telephone:    |                                   |
| Laboratory locations of work:  | CASH-Synergy | Main Building | Icon Court                        |
| Time and duration of work:   | From:        |               | To ( <i>latest finish time</i> ): |
| Day & date work is to be done:   | Day:         |               | Date:                             |
| Brief description of work ( <i>for the general reader; Use continuation sheet if needed</i> ): |              |               |                                   |

|  |                                  |       |                         |       |            |
|--|----------------------------------|-------|-------------------------|-------|------------|
| <b>Risk Assessment</b>   |                                  |       | <b>Needs a partner:</b> |       |            |
| <b>Risk Category<sup>1</sup></b>                                 | <b>Identify specific hazards</b> |       | <b>Yes:</b>             |       | <b>No:</b> |
|  |                                  |       | Name of partner:        |       |            |
|  |                                  |       | Signature:              |       |            |
| <b>Work approved by supervisor (tick appropriate box):</b>       |                                  |       | <b>Yes:</b>             |       | <b>No:</b> |
| <b>Signatures:</b>   | <b>Researcher:</b>               |       | Date:                   |       |            |
|  | <b>Supervisor:</b>               |       | Date:                   |       |            |
|  | <b>Estates Office:</b>           |       | Date:                   |       |            |
| Copy delivered to Caretakers / Security:                         |                                  | Time: |                         | Date: |            |
| Copy delivered to Building Manager / Admin Office <sup>2</sup> : |                                  | Time: |                         | Date: |            |

**Notes:** **1:** See end of next page. **2:** Researchers requiring access out of hours will require a key to the building and alarm access code from the Research Admin Office and a separate key to the college gates from Caretakers/Security.

#### **OUT OF HOURS ACCESS REQUEST FORM - Continuation Sheet**

Brief description of work (for the general reader; continuation sheet):



|                                     |  |            |  |
|-------------------------------------|--|------------|--|
| Name of Researcher( <i>print</i> ): |  | Telephone: |  |
| Signature:                          |  | Telephone: |  |

**Risk Categories**

Project supervisors should categorise proposed experimental work into the following risk categories:

- A. Those tasks that may only be undertaken with close senior supervision. Performance of Category A risk tasks is deemed unacceptable outside of normal working hours 09.00 – 17.30 Monday – Friday.
- B. High risk activities to be carried out only by experienced researchers with a competent partner in attendance.
- C. Medium risk activities to be carried out by sufficiently competent researchers (may or may not require a partner) including experimental work with some risks (other than A and B) where care must be observed but it is considered that workers are adequately trained and competent in the procedures to be able to work alone. C risk activities require some training beyond undergraduate level but should form a large part of the normal "background" of daily business and fall outside of Category D.
- D. Low risk activities to be carried out by any postgraduate student, researcher, or staff member including general laboratory practices which include all procedures covered in undergraduate teaching laboratories.
- E. Those tasks which, even without training, carry very low levels of risk e.g. work that is purely theoretical or computational in nature.



# APPENDIX 7: CHEMICAL AGENTS RISK ASSESSMENT FORM

## TU Dublin – Tallaght Campus Chemical Agents Risk Assessment Form

|  |                 |                              |                 |
|--|-----------------|------------------------------|-----------------|
| Name & Status of Person Carrying Out Assessment  |                 |                              |                 |
| Date of Assessment   |                 |                              |                 |
| Location Of Work   |                 |                              |                 |
| Detail The Process Involving The Use Of Hazardous Agents – indicate the frequency and duration of the process and who will be carrying it out – if necessary attach a written procedure for the process. |                 |                              |                 |
|  |                 |                              |                 |
| Is the process suitable for lone working?  | Yes             |                              | No              |
| Is specialist training required before this process commences?   | Yes             |                              | No              |
| Hazardous Agent To Be Used   | Amount          | Physical Form                |                 |
|  |                 |                              |                 |
|  |                 |                              |                 |
|  |                 |                              |                 |
| Reaction Hazards ( Exotherms / runaway scenarios / post-reaction evolutions )  |                 |                              |                 |
|  |                 |                              |                 |
| List Persons Likely To Be Exposed To Chemical Agents:  |                 |                              |                 |
|  |                 |                              |                 |
| 10. Indicate Hazard Classification of <u>All Agents Used</u>   |                 |                              |                 |
| <b>Hazard Classification</b>   | <b>Chemical</b> | <b>Hazard Classification</b> | <b>Chemical</b> |
| Explosive  |                 | Oxidising                    |                 |
| Extremely flammable  |                 | Irritant                     |                 |
| Highly flammable   |                 | Terratogen                   |                 |
| Flammable  |                 | Very toxic                   |                 |
| Harmful  |                 | Sensitizer                   |                 |
| Corrosive  |                 | Hazardous to environment     |                 |
| Toxic  |                 |                              |                 |
| Potential Routes of Exposure <i>tick as appropriate</i>  |                 |                              |                 |

|   |                      |   |         |
|---|----------------------|---|---------|
| Inhalation:   | Skin Contact:        | Ingestion:                              | Sharps: |
|   |                      |   |         |
| <b>Indicate Hazard &amp; Precautionary Phrases For All Materials</b>  |                      |   |         |
| <b>Chemical</b>   | <b>Hazard Phrase</b> | <b>Precautionary Phrase</b>             |         |
|   |                      |   |         |
|   |                      |   |         |
| <b>Could a less hazardous substance (or form of substance) be used instead?</b>   | Yes                  | No                                      |         |
| <b>If the less hazardous substance cannot be used please give reasons:</b>  |                      |   |         |
|   |                      |   |         |
| <b>Is health surveillance required?</b>   | Yes                  | No                                      |         |
| <b>NOTE: Criteria for conducting Health Surveillance</b>  |                      |   |         |
| 1. There is an identifiable disease or other identifiable adverse health outcome  |                      |   |         |
| 2. The disease or health effect may be related to exposure  |                      |   |         |
| 3. There is a likelihood that the disease or health effect may occur  |                      |   |         |
| 4. There are valid techniques for detecting indications of the disease or health effects  |                      |   |         |
| <b>Is there any specific training required?</b>   | Yes                  | No                                      |         |
| <i>If yes, specify:</i>   |                      |   |         |
| <b>Are there any specific precautions to be taken with respect to sensitive groups e.g. pregnant workers?</b>   | Yes                  | No                                      |         |
| <i>If yes, specify:</i>   |                      |   |         |
| <b>Are all chemicals to be used labelled appropriately?</b>   | Yes                  | No                                      |         |
| <b>Occupational Exposure Limit Values (OELVs)</b>   |                      |   |         |
| <i>NOTE: An Occupational Exposure Limit Value (OELV) is the maximum permissible concentration of a chemical agent in the workplace to which workers may be exposed when measured or calculated by reference to a specified time period.</i> |                      |   |         |
| <b>Please document OELVs (if available) of any hazardous substances</b>   |                      |   |         |
| <b>Chemical</b>   | <b>OELV</b>          |   |         |
|   |                      |   |         |
|   |                      |   |         |
| <b>Control Measures Designed To Allow Safe Use Of Chemicals</b>   |                      |   |         |
| <b>A. PPE Required:</b>   |                      | <b>B. Engineering Controls Required</b> |         |

|   |                   |   |   |   |   |
|---|-------------------|---|---|---|---|
| Lab Coat  |                   | Fume Hood                                   |   |   |   |
| Safety Glasses  |                   | Other (give details)                        |   |   |   |
| Face Shield   |                   |   |   |   |   |
| Gloves (indicate type)  |                   |   |   |   |   |
| Other (give details)  |                   |   |   |   |   |
| <b>C. Emergency Response</b>  |                   |   |   |   |   |
| <i>Fire (consult relevant MSDS for further information)</i>   |                   |   |   |   |   |
| <i>First Aid Responses (consult relevant MSDS for further information) - An MSDS must accompany all victims of exposure when seeking medical advice. Always consult an MSDS following an exposure to a hazardous agent.</i>   |                   |   |   |   |   |
| <i>Spill Response (consult relevant MSDS for further information)</i>   |                   |   |   |   |   |
| <b>D. Further Risk Control Measures Required</b> e.g. demarcation of working area; isolation of ignition sources; use of warning signage; the use of additional safety equipment; implementation of safe handling, transport and storage arrangements; availability of appropriate first aid equipment / antidotes;   |                   |   |   |   |   |
| <b>Risk Rating - Assessment of Severity (High (H) = Very Harmful; Medium (M) = Harmful;</b>   |                   | <b>Severity: Low (L) = Slightly Harmful</b> |   |   |   |
| <u>Assessment of Likelihood of Exposure:</u><br><br>High (H) = Very Likely<br>Medium (M) = Likely<br>Low (L) = Unlikely   | <b>Likelihood</b> |   | L | M | H |
|   |                   | L   | 1 | 2 | 3 |
|   |                   | M   | 2 | 3 | 4 |
|   |                   | H   | 3 | 4 | 5 |
| <b>Risk = Severity x Likelihood</b>   |                   | <b>Shaded Area = risk rating</b>            |   |   |   |
| <b>RISK RATING =</b>  |                   |   |   |   |   |
| <ol style="list-style-type: none"> <li>1. Trivial Risk: No further action needed.</li> <li>2. Acceptable Risk: No additional risk control measures required.</li> <li>3. Moderate Risk: Implement further risk control measures if possible.</li> <li>4. Substantial Risk: Further risk control measures must be implemented. If this is not possible then work must be strictly managed to ensure safety.</li> </ol> |                   |   |   |   |   |



|  |             |                 |  |    |
|--|-------------|-----------------|--|----|
| 5. Intolerable: Work must be prohibited until further control measures are implemented.  |             |                 |  |    |
| <b>Is the risk rating acceptable?</b>  |             | Yes             |  | No |
| <i>If yes sign and date below and ensure all risk control measures have been implemented.</i>  |             |                 |  |    |
| <i>If no identify further control measures and reassess the risk. If the risk cannot be reduced to an acceptable level then process cannot be carried out.</i> |             | Yes             |  | No |
| <b>Signed</b>  | <b>Date</b> | <b>Position</b> |  |    |
|  |             |                 |  |    |

## Appendix 7 continued: Control of Spills or Accidental Releases of Chemicals

Chemical spills/releases can present a serious risk to the health and safety of people in the building. A chemical spill/release can vary from a localised spill of liquid / powder to more serious cases involving the release of toxic and/or flammable fumes into adjoining areas.

All accidents, hazardous materials spills or other dangerous incidents must be reported (Report Form – **Appendix 8**).

In the event of a fire, activate the nearest fire alarm. If you are unable to control or extinguish a fire, follow the building evacuation procedures below.

### 7.1 Control of Major Spills / Releases of Chemicals

In the event of a major chemical spill/release or discovery of a chemical spill or smell of any potentially harmful material follow the following steps:

- 1) Inform all persons present in the lab of the spill and ensure that they evacuate immediately.
- 2) In serious cases, especially where toxic and/or flammable fumes might potentially escape into adjoining areas sound the fire alarm and initiate a whole building evacuation.
- 3) If the spilled material is flammable, turn off all potential ignition sources. Avoid breathing vapors of the spilled materials. Be aware that some materials either have no odors or create olfactory fatigue, so that you stop smelling the odor very quickly.
- 4) Leave on or establish exhaust ventilation (open windows etc.) if it is safe to do so. Close doors to slow down the spread of odors.
- 5) ***If there is an immediate threat to life or health*** call the Emergency Services for assistance with injured persons, fire, or for performing rescues. Explain the nature and the extent of the emergency - be as specific and detailed as possible.
- 6) Attend to any person(s) who may have been contaminated and/or injured if it is safe to do so. Use safety drench showers and eyewashes as appropriate. In the case of eye contact, promptly flush eyes with water for a minimum 15-minute period and seek medical attention immediately.
- 7) Leave the lab yourself by the nearest exit closing the door behind you and evacuate the building.



- 8) Prevent re-entry to the lab. Shut all other entry / exit doors from the outside. Close off access to the affected corridor.
- 9) Where the fire alarm has been raised, inform fire wardens and other emergency personnel of the nature of the hazard (see Appendix 12 for list of Fire Wardens).
- 10) If safe to do so, place a Chemical Spill Warning sign on each affected lab door warning that the lab is closed and entry is prohibited. Place one of these in a prominent position on each door into the lab.
- 11) Under no circumstances must any person return to the lab without appropriate PPE.
- 12) Report all breaches of this protocol regarding evacuation requests and re-entry to the Building Manager.
- 13) Contact a relevant technician for the area to deal with the spill. Provide details of the nature of the substance if known, its location, the quantities involved, and any other information that may be of use. Consult the relevant MSDS sheets for additional information (see <http://www.sigmaaldrich.com/safety-center.html>).
- 14) Do not withhold any information that may put them or anybody else in danger.
- 15) The lab may be re-opened after a suitable time frame and when deemed safe to do so by the Building Manager and / or relevant technicians and supervisors.

## 7.2 Control of Minor Spills / Releases of Chemicals

In the event of a minor localised chemical spill or discovery of a chemical spill or smell of any potentially harmful material follow the following steps:

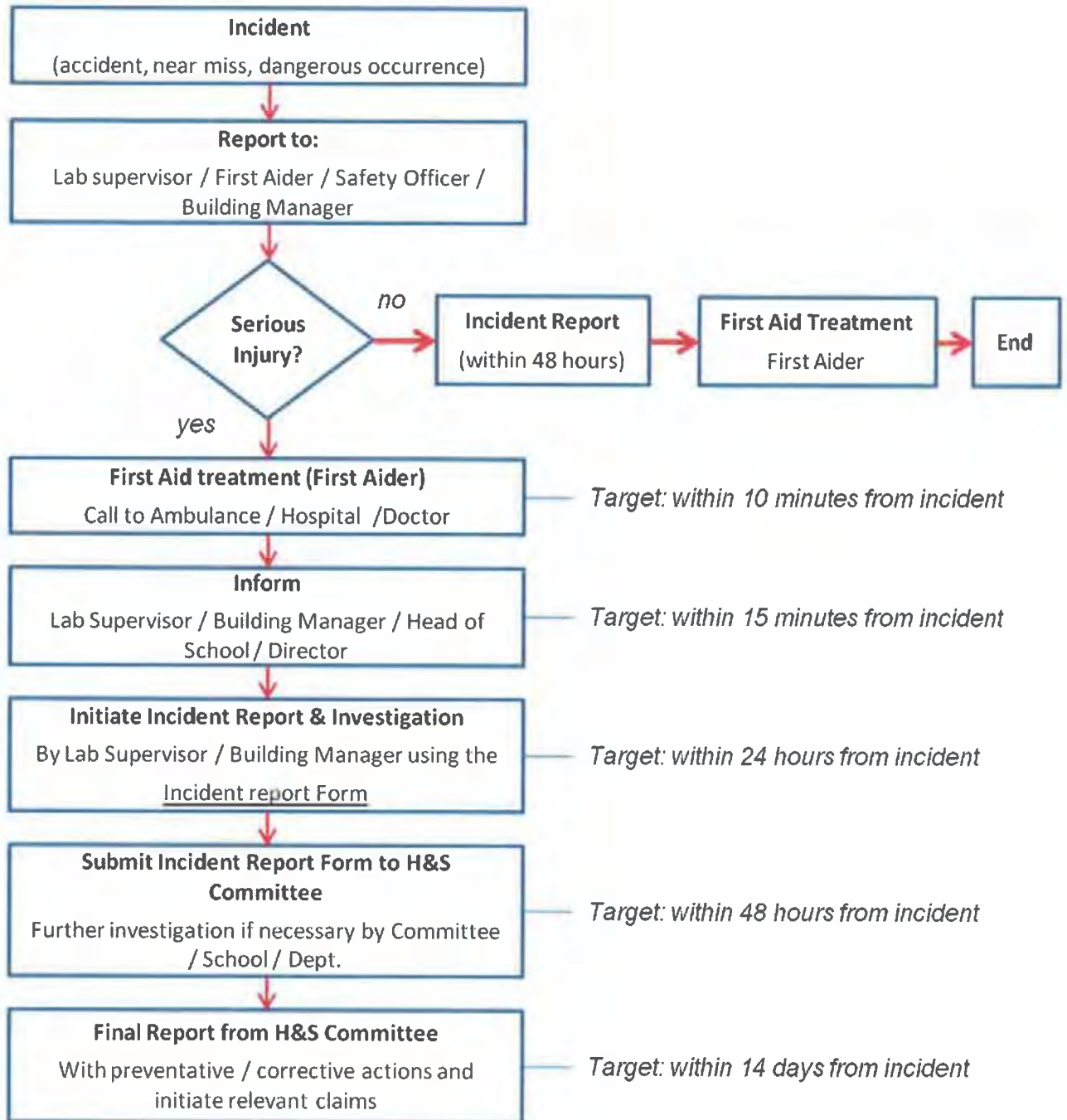
- 1) Attend to any person(s) who may have been contaminated and/or injured if it is safe to do so. Use safety drench showers and eyewashes as appropriate. In the case of eye contact, promptly flush eyes with water for a minimum 15-minute period and seek medical attention immediately.
- 2) For cases of ingestion of chemicals, contact the Student Health Center and/or Emergency Medical Services. In case of skin contact, promptly flush the affected area with water and remove any contaminated clothing or jewelry. If symptoms persist after washing, seek medical attention.
- 3) Cordon off the affected area.

- 4) Notify persons in the immediate area about the spill, evacuating all non-essential personnel from the spill area and adjoining areas that may be compromised by vapors or a potential fire.
- 5) If the spilled material is flammable, turn off all potential ignition sources. Avoid breathing vapors of the spilled materials. Be aware that some materials either have no odors or create olfactory fatigue, so that you stop smelling the odor very quickly.
- 6) Leave on or establish exhaust ventilation (open windows etc.) if it is safe to do so. Close doors to slow down the spread of odors.
- 7) If the spill is minor and of known limited danger, clean up immediately using an appropriate spill control kit (available in the chemical store room and the synthetic chemistry lab). Determine the appropriate cleaning method by referring to the MSDS (see <http://www.sigmaldrich.com/safety-center.html>). During cleanup, use *appropriate* protective apparel/equipment. The protective clothing required will depend upon the material spilled, the amount, and the airborne concentration. At a minimum, chemical resistant gloves and goggles should be worn.
- 8) Cover liquid spills with compatible absorbent material such as spill pillows or vermiculite. Be sure to check compatibility. Powdered materials should be covered with wet paper towels (if compatible) to avoid dispersal. If appropriate materials are available, corrosives should be neutralized prior to absorption. Clean spills from the outer areas first, cleaning towards the center.
- 9) Place the spilled material into an impervious container, and seal. Contact the technicians to arrange for disposal of the material.
- 10) If appropriate, wash the affected surface with soap and water. Mop up the residues and containerize for disposal.
- 11) A solvent, e.g. xylene, may be necessary to clean surfaces contaminated with a non-water soluble chemical. Be sure to check the solubility of the spilled material and use the least toxic effective solvent available. Be sure to wear appropriate protective equipment.
- 12) Report to incident to the Building Manager.

### 7.3 Building Evacuation Procedures

- 1) Building evacuation may be necessary if there is a chemical release, fire, explosion, natural disaster, or medical emergency.
- 2) **Be aware of the marked exits** from your area and building.
- 3) The evacuation alarm is a loud continuous siren and must be obeyed. When sounded, leave by the nearest available exit. **Do not return until the Fire/Safety Wardens give the all clear.**
- 4) To activate the building alarm system, break one of the emergency fire alarm glasses located in the hallway. Contact Security/Buildings Office to identify yourself and the cause of the alarm. If there is a fire, call the Fire Brigade, give your name, and describe the exact location (building name, location, and room number) and size of the fire.
- 5) *Whenever* the building evacuation alarm is sounded or when you are ordered to leave by the Fire Wardens, or emergency response personnel, **walk quickly to the nearest marked exit and ask others to do the same.**
- 6) Outside, **proceed to a clear assembly area.** The Assembly area for CASH/Synergy is in the Car Park at the west end of the building (towards the Belgard Road). Keep roads and walkways clear for emergency vehicles.
- 7) Do not return to the building until you are told to do so. The **all-clear signal is three blasts from an air horn** to be sounded by the Fire Wardens. *Just because the fire alarm in the building stops does not mean it is safe to re-enter* – it may have stopped for other reasons e.g. power failure.

## Appendix 8: Incident / Accident Report Process



## Appendix 9: TU Dublin - Tallaght Campus

### Accident/Incident Report Form

All incidents resulting in personal injury, dangerous occurrences and near misses which could have resulted in injury must be reported within 24 hours. Please see overleaf Information to assist completion.

| Section A   |         |               |           |                  |           |
|---|---------|---------------|-----------|------------------|-----------|
| Date of Incident  |         | Time          |           | Exact Location   |           |
|   |         |               |           |                  |           |
| Name of Injured:  |         | Course Code:  |           | Title of Course: |           |
|   |         |               |           |                  |           |
| Student:  |         | Student ID:   |           | Contact No.:     |           |
| Staff:  |         | Staff ID:     |           | Contact No.:     |           |
| Visitor:  |         | Company Name: |           | Contact No.:     |           |
| Section B   |         |               |           |                  |           |
| Referred to Student Health Centre:  |         | Yes:          |           | No:              |           |
| <i>Nature and extent of Injury or Damage:</i>                                     |         |               |           |                  |           |
| <i>Body part affected:</i>  |         |               |           |                  |           |
| Referred to:  | Doctor: |               | Casualty: |                  | Transport |
| Follow up required:   | Yes     |               | No        |                  |           |
| <i>Signature of Nurse :</i>   |         |               |           | Date:            |           |
| <b>Section C - Description of Incident.</b>                                       |         |               |           |                  |           |
| <i>Activity of person at time of incident: (use continuation sheet if needed)</i> |         |               |           |                  |           |
| <i>Root cause of Injury or Damage:</i>  |         |               |           |                  |           |
| Personal Protective Equipment worn:   |         | Yes           |           | No               |           |

|                                |  |        |         |                       |  |  |                                  |  |        |      |       |  |
|--------------------------------|--|--------|---------|-----------------------|--|--|----------------------------------|--|--------|------|-------|--|
| What type was worn:            |  |        |         |                       |  |  |                                  |  |        |      |       |  |
| Witness to incident: name      |  |        |         |                       |  |  |                                  | Phone no:                              |        |      |       |  |
| <b>If a Fire</b>               |  |        |         |                       |  |  |                                  |  |        |      |       |  |
| Was Fire Brigade called:       |  |        |         | Yes - time            |  |  |                                  | No                                     |        |      |       |  |
| Were Fire Extinguishers used:  |  |        |         | Yes - type            |  |  |                                  | No                                     |        |      |       |  |
|                                |  |        |         | State serial numbers: |  |  |                                  |  |        |      |       |  |
| <b>SECTION D</b>               |  |        |         |                       |  |  |                                  |  |        |      |       |  |
| <b>Corrective Action Taken</b> |  |        |         | <b>By Whom</b>        |  |  |                                  | <b>Planned completion Date/ Signed</b> |        |      |       |  |
|                                |  |        |         |                       |  |  |                                  |  |        |      |       |  |
|                                |  |        |         |                       |  |  |                                  |  |        |      |       |  |
| Signature of Supervisor:       |  | Print: |         |                       |  |  |                                  | Signed:                                |        | Date |       |  |
| Signature of Head of Dept:     |  | Print: |         |                       |  |  |                                  | Signed                                 |        | Date |       |  |
| <b>Office Use Only</b>         |  |        |         |                       |  |  |                                  |  |        |      |       |  |
| Classification:                |  |        | Action: |                       |  |  | Incident Entered in Report Book: |  |        |      |       |  |
|                                |  |        |         |                       |  |  |                                  |  |        |      |       |  |
| Reported by:                   |  |        | Print:  |                       |  |  |                                  |  | Signed |      | Date: |  |

**Guidelines for the Completion of Accident Report Form**

- All Accidents/Incidents must be documented using Accident Report Form.
- All originals to be kept in the Health Centre / Caretakers Office until sign off.
- Copies may be taken to ensure any Corrective Action required, be followed through.
- In the case of an accident involving staff, Head of Dept. will need to complete supervisors' sections.

**Section A**

- This section may be completed by Student Health Centre if attendance is required where there has been an Injury.
- In the case of for any incidents or near misses or theft (none of which results in an injury) this section should be filled in and submitted to Caretakers Office by the person involved.
- *Within this section, Nature of Injury:* refers to the type e.g. fall, trip, burn, laceration etc.

**Section B**

- This section to be completed by Student Health Centre. Detailed reports of injury are documented in a personal medical file stored in the Health Centre. If follow up is required updates will be relayed to the supervisor as appropriate. Signature is required upon completion.



### Section C

- This section to be completed by supervisor / Host where
- The person affected is a visitor to the Institute or is involved in any student based activity (i.e. attending labs, lectures)

**Provide a brief description of the activity the person was performing at the time of the incident.**  
(Example: Person states he was exiting the room when he tripped over a cable and sustained an injury to his arm.)

**Root cause of injury:** Provide a description of the most basic cause of the incident.

Examples:

- **Behaviour - Individual.** Inattention; haste/short-cut; improper use of equipment; operating without authority.
- **Behaviour -Others.** Same as above except injury caused by other person's behavior.
- **Training** Incident a direct result of inadequate or a lack of training.
- **Policy/Procedures enforcement.** Incident resulted by an inaccurate, lack of policy/procedure, or lack of enforcement.
- **Equipment safety devices.** Incident caused primarily by defective equipment, missing or inadequate safety devices.
- **Ergonomics force/lifting etc.** Injury caused by mechanical stress, awkward posture, improper force/lifting etc.
- **Personal Factor barrier, stress etc.** May include personal medical issues, medications, fatigue, language barrier, stress etc.
- **Work Environment equipment,** Incident caused by a physical or chemical factor e.g. availability of proper equipment, design/layout, noise, temperature, housekeeping, availability of PPE.
- **Unknown** Root cause cannot be determined.

### Section D

- To be completed by supervisor / Host.
- Corrective actions to be decided to correct cause of incident and avoid a future occurrence.
- Ownership of corrective action is required to ensure completion.
- Planned completion date of corrective action - this is open to change.
- Head of Department / Responsible Person will sign off on actual completion date.



## Appendix 10: Emergency Evacuation Procedure

All persons working in the C.A.S.H. - Synergy Building are required to

- 1) Be familiar with **GREEN EVACUATION** signs in the corridors and with the location of the various assembly areas.
- 2) Be familiar with the escape/exit points from the building and assembly areas as shown on the attached drawings.
- 3) Keep the roadways around the building clear.
- 4) **In event of an Alarm being raised, everyone should make their way to the nearest available exit point, evacuate the building and go to the designated assembly point in an efficient and orderly manner. The Designated Assembly Point For Cash/Synergy Is In The Car Park To The West End Of The Building (Towards Belgard R&D.)**
- 5) Take only your immediate belongings.
- 6) Close the door to the room you are vacating.
- 7) Do not use the lift.
- 8) Assist anyone who may be disabled, but wheel chair users should park in the escape stairways. One person may stay with them, they will be assisted out of the building. The stair wells of the C.A.S.H. building are fitted with emergency call buttons for use by persons in the stair wells and unable to exit.
- 9) **ASSEMBLY POINTS** are defined by which door is exited. Fire exits will have signs designating which assembly point is to be used for that exit. Nobody, Staff or Student, should leave the assembly area until the all-clear is given.
- 10) Wardens have been appointed on each floor to ensure that all rooms have been cleared (see Appendix 12 for list of Fire Wardens).
- 11) The caretakers will contact the emergency services. A control centre, with a designated controller (one of the caretakers), will operate at the front door.
- 12) The person that activates the alarm must make him/herself available to the controller and the fire-brigade.
- 13) All incidents must be recorded on an incident sheet. These are available from the caretakers, the laboratory technicians or the school secretaries (Report Form – **Appendix 8**).
- 14) The silencing of the alarm does not indicate the all clear to re-enter the building.

- 15) The **ALL-CLEAR SIGNAL** to re-enter the building will consist of **3 blasts from an air horn**. *Just because the alarm stops does not mean it is safe to re-enter – it may have stopped for other reasons e.g. power failure.* **Target evacuation time 2.5 minutes.**

## **EMERGENCY EVACUATION PROCEDURES FOR EVENING AND OTHER NON-STANDARD TIMES**

In the event of there being an emergency evacuation required during the evening, e.g. after the day-time hours are finished, or other such time when the "day time" wardens and controllers are not normally on duty, the following are the procedures to be followed in addition/substitution to day time procedures:

- 1) The caretakers on the desk will immediately on hearing the alarm ring security and require that the college gate is opened and that the roadway is kept clear.
- 2) One caretaker will act as warden for the ground floor, ensuring that it is cleared in an orderly manner, and return to the front entrance as quickly as possible to act as controller.
- 3) The second caretaker will act as warden for both upper floors and as soon as they are cleared return to the front desk to assist the controller.
- 4) All persons should proceed to the designated assembly point by the most direct and safest route consistent with the condition prevailing. The main entrance should not be considered as the only route for egress. Assembly points are defined by which door is exited. **THE Designated Assembly Point For Cash/Synergy Is In The Car Park To The West End Of The Building (Towards Belgard R&D.)**
- 5) People should not congregate around the main entrance under any circumstances, as this area must be kept free for the incident controllers and emergency services.

**The target time for clearing the building is 2.5 minutes.**

# Appendix 11: C.A.S.H. / Synergy Emergency Exits and Fire Assembly Points

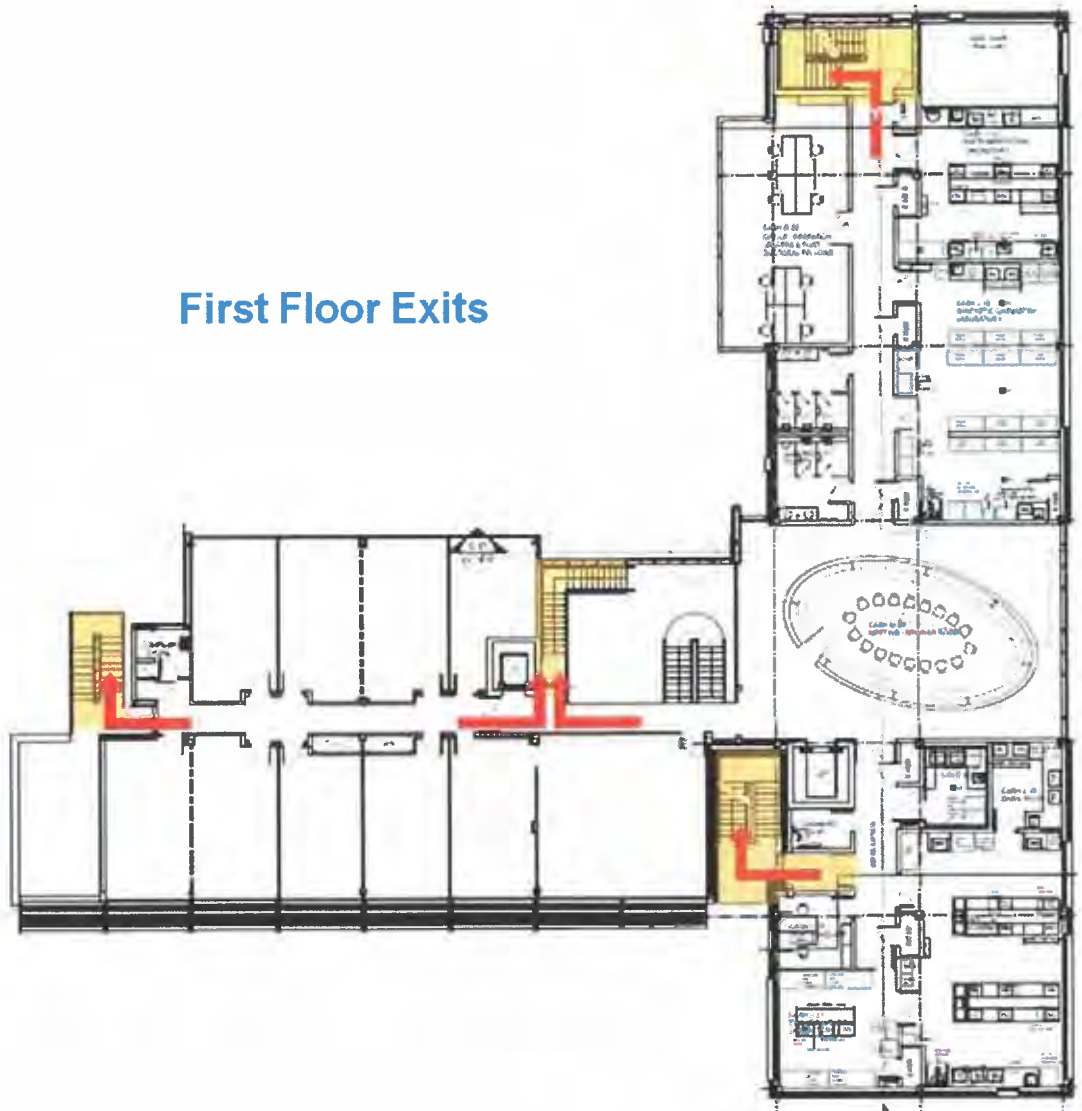
## Ground Floor Exits

Fire Assembly Point



## First Floor Exits

Fire  
Assembly  
Point



# Second Floor Exits

Fire  
Assembly  
Point



## Appendix 12: Emergency Contact Numbers

| ITT Dublin                                       | Extension Numbers to dial: 01-404-abcd                   |
|--|--|
| • Reception                                      | 2100   |
| • Caretakers                                     | 2601 / 2610  |
| • Campus Security                                | 087-771-0799   |
| • Assistant Estates Manager                      | 2139   |
| • Estates Manager                                | 2630   |
| • CASH Building Manager                          | 2803 / 2060 / 2327                                       |
| • Technical Support                              | 2391 / 2115 / 2414 / 2365                                |
| Medical Assistance                               | Extension Numbers to dial: 01-404-abcd                   |
| • Nurse / Health Centre                          | 2613   |
| • Doctor   | 2614   |
| • Tallaght Hospital                              | To Dial external No.: 9-01-414-2000                      |
| • Poisons Information Centre, Beaumont Hospital  | To Dial external No.: 9-8379964 / 9-8379966              |
| Emergency Services                               | External Number to Dial: <i>Dial 9 for external line</i> |
| • Emergency Services – Fire / Ambulance / Gardaí | To Dial external No.: 9-999 / 9-911 / 9-112              |
| • Gardaí – Tallaght                              | To Dial external No.: 9-666-6000                         |

| Laboratory / Room Telephone Numbers          | Extension Numbers to dial: 01-404-abcd |
|--|--|
| • The POD                                    | 2960                                   |
| • Microbiology lab                           | 2953                                   |
| • Sensors lab                                |  |
| • AFM room                                   | 2952                                   |
| • Postgraduate Office, 2 <sup>nd</sup> Floor | 2961                                   |
| • Mechanical Post-Grad room                  | 2958                                   |
| • Meeting room, ground floor                 | 2953                                   |
| • Analytical lab                             | 2954                                   |
| • Synthetic chemistry lab                    | 2955                                   |
| • MiCRA Office, 1 <sup>st</sup> Floor        | 2965/2033/2046                         |
| • Microbiology lab                           | 2956                                   |



|                    |                             |
|--------------------|-----------------------------|
| • Innovation A     | 2966 / 2967                 |
| • Innovation B     | Connexicon: 086 3934425     |
| • Innovation C     | Vornia/Ashland: 01 531 2981 |
| • Anechoic chamber |                             |



## Emergency Contact Numbers – First Aiders

### First Aiders in the CASH building

| First Aiders      | Extension Numbers to dial: 01-404-abcd |
|-------------------|--|
| • Muire Coby      | 2327                                   |
| • Jennifer Hughes | 2533                                   |
| • Eadaoin Ledwige | 087 2835646                            |

### Other First Aiders on Campus / Numbers to dial (Extension Numbers to dial: 01-404-abcd)

| First Aiders                              | Extension 404-abcd | First Aiders                       | Extension 404-abcd |
|---|--------------------|------------------------------------|--------------------|
| • David Saville - Science                 | 2414               | • Eamonn Quigley – Engineering     | 2837               |
| • Eleana Dunne                            | 2154               | • Paul Tierney – Engineering       | 2393               |
| • Debbie Collins - Science                | 2365               | • Terence (Traolach) – Engineering | 2884               |
| • Eleana Dunne - Science                  | 2154               | • Martin Stafford – Buildings      | 2610               |
| • Hugh Gallagher - Science                | 2506 / 2414        | • Terry Brennan – Student Services | 2770               |
| • Aine McParland - Science                | 2414               | • Patricia Morris – Business       | 2878               |
| • Mark Murphy - Engineering               | 046 26058          | • Fernando Perez – Computing       | 2242               |
| • John Fox – Engineering                  | 2513               | • Paul Butler – Computing          | 2829               |
| • Terry Brennan – Engineering             | 2043               | • Tim O'Connor - Sports            | 2550               |
| • Brian O Donnchadha – Engineering        | 2349               | • Gerry Anderson – Sports GAA      | 2551               |
| • David Maguire – Engineering             | 2511               | • Jennifer Ball - Library          | 2133               |
| • Emma Caraher – Science & CASH Centre PI | 2296               | • Philip Russell - Library         | 2202               |

## Emergency Contact Numbers – Fire Wardens

| <b>Fire Wardens – CASH Building</b>  | <b>Extension Numbers to dial: 01-404-abcd</b>   |
|--|---|
| <ul style="list-style-type: none"><li>Mary Deasy – Ground floor</li></ul>                    | 2803  |
| <b>Fire Wardens – Synergy Building</b>   | <b>Extension Numbers to dial: 01-404-abcd</b>   |
| <ul style="list-style-type: none"><li>Synergy Manager – Ground floor / coordinator</li></ul> | 2221 / 087 981 3674                             |
| <ul style="list-style-type: none"><li>Anna Woodward-Kennedy – First floor</li></ul>          | 086 0468766 – CPR trained for children & adults |
| <ul style="list-style-type: none"><li>Daria Szczygiel – First floor</li></ul>                | 085 7691413                                     |
| <ul style="list-style-type: none"><li>Seamus Kilmartin – Second floor</li></ul>              | 086 8245160                                     |
| <ul style="list-style-type: none"><li>Ed Duffy – Second floor</li></ul>                      | 087 9266899                                     |
| <ul style="list-style-type: none"><li>Ben Teeling – Second floor</li></ul>                   | 087 6354974                                     |

## Appendix 13:

# Health & Safety Familiarization and Personal Behaviour in the Laboratories Declaration

1. The assignment of bench and desk space to researchers in the CASH building requires approval from the Centre Manager or the Department of External Services on the recommendation of an academic student supervisor / Lead PI. **The primary responsibility for the conduct of each worker in the CASH building rests with the supervising academic staff/lead PI.**
2. All workers in the CASH building are expected to act in a **conscientious and responsible** manner; be responsible to yourself, your supervisor and all other persons.
3. **Personal safety**, and laboratory and other area security are of utmost importance and are for the well-being of all personnel. Observe the established safety and security rules. **Violation may result in temporary or permanent suspension of access to the CASH building, as judged by the Institute.**
4. **Willful sabotage** of laboratory equipment or the experiments of others, if proven, **will result in immediate expulsion** from the CASH building, and in serious cases, from the Institute.
5. All equipment, chemicals and reagents are Institute property. **Unauthorized removal of such items from the building will result in disciplinary action.** If the offence is judged **serious**, such as unauthorized removal of toxic or biohazardous materials from the lab, **immediate expulsion** may also be imposed by the Institute on recommendation from the CSSC.
6. Use of **personal laptop/tablet and laboratory computers** in the building should be for **research-related work only**. Unlawful downloading and computer gaming are forbidden.
7. Observe the **safety rules for the use of all equipment**. Failure to do so may result first in warning and subsequently in suspension of rights to use the equipment.
8. Observe **good laboratory practice** in the laboratories at all times:
  - 8.1. No eating and drinking except in designated areas;
  - 8.2. Laboratory coats, safety glasses, and shoes that cover your feet and toes must be worn at all times in laboratory areas. Additional personal protection equipment (PPE)

should be worn as required when performing tasks carrying additional risk e.g. handling of liquid nitrogen shall require a faceguard and thermal safety gloves;

8.3. Maintain the cleanliness of work areas;

8.4. Do not be wasteful; be environmentally aware when disposing of all wastes.

9. Each laboratory worker is responsible for all **work-related visitors** brought to the lab. Work-related visitors are expected to observe normal safe work practices at all times.

10. In case of **accidents or other extraordinary circumstances, report immediately** to the building manager and the project supervisor. Workers who fail to do so may be held responsible for property damages and personal harms leading to **financial compensation and/or legal action.**

I hereby state that the above code of conduct in the C.A.S.H. Research building, TU Dublin – Tallaght Campus has been read and understood.

Researcher: *Print name:* \_\_\_\_\_

Date: \_\_\_\_\_

*Signature:* \_\_\_\_\_

Date: \_\_\_\_\_



# Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations



## TU Dublin – Tallaght Campus

### **Appendix**

## Laboratory Biosafety Manual

## Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations

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|--|----------|
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| Form 7.1 Microorganism or infectious material form   |          |
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| Form 7.3 Biological Agent Risk Assessment Form   |          |
| SOP 9.1 Emergency Wash Facilities  |          |
| SOP 9.2 Biological Spill Control   |          |
| SOP 9.3 Handling Broken Glass and Tubes  |          |
| SOP 9.4 Cleaning activities in Class II Microbiology Lab   |          |
| SOP 9.5 Safe Storage of Infectious Materials<br>Pathogen inventory and ATCC collection catalogue |          |
| SOP 9.6 Control of Biohazard Waste   |          |
| SOP 9.7 Biological Safety Cabinet Class II   |          |



# Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations

|   |                  |            |  |
|---|------------------|------------|--|
| Ref. No.  | <b>SOP - 5.1</b> | Issue Date |  |
| Version   |                  | Page No.   |  |
| <b>5.2 PERSONNEL</b>  |                  |            |  |
| <b>Title: INDUCTION CHECKLISTS (Job Information, Laboratory Safety)</b> |                  |            |  |
| Authorised by   |                  |            |  |

## SOP 5.1 Laboratory Safety Induction Checklist

Name: \_\_\_\_\_

Inducted by: \_\_\_\_\_

Date: \_\_\_\_\_

### **JOB INFORMATION**

|  |  |
|--|--|
| The employee is familiar with the function of the laboratory and services                                  |  |
| Is familiar with the laboratory staff structure and responsibilities of various laboratory staff           |  |
| Is aware of the specific duties required and expectations  |  |
| Understands the format of Laboratory manuals and other laboratory documentation and where they are located |  |
| Is familiar with the laboratory ordering system  |  |

Signed (staff): \_\_\_\_\_

Signed (supervisor): \_\_\_\_\_

Date: \_\_\_\_\_

# Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations

Name: \_\_\_\_\_

Inducted by: \_\_\_\_\_

Date: \_\_\_\_\_

## **LABORATORY SAFETY INDUCTION CHECKLIST**

### **1. Laboratory Induction**

|  |  |
|--|--|
| Copy of General Laboratory Safety Rules and Regulations have been issued and discussed   |  |
| CASH-Synergy Ancillary Health & Safety Statement <sup>1</sup> was read and understood  |  |
| Employees are requested to read the Safety, Health and Welfare at Work Act, 2005 a copy of which is available at <a href="http://www.oireachtas.ie/documents/bills28/acts/2005/a1005.pdf">http://www.oireachtas.ie/documents/bills28/acts/2005/a1005.pdf</a> . |  |
|  |  |

### **2. Emergency and First Aid Procedures**

|   |  |
|---|--|
| Employee has reviewed emergency numbers.<br>Emergency Services – Fire / Ambulance / Gardaí To Dial external No.: 9-999 / 9-911 / 9-112<br>First Aiders in the CASH building: <ul style="list-style-type: none"> <li>• Colin Bright 2957 / 2958</li> <li>• Aoife Delaney 2955</li> <li>• Rachel Kavanagh 2955</li> </ul> |  |
| Employee has been shown the location of the first aid boxes   |  |
| Employee has been shown the location of nearest fire alarm, fire blanket and fire extinguisher, its type and suitability  |  |
| Employee has been shown the location of Emergency Information Sheets (includes names of first aiders)   |  |

## Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations

|  |  |
|--|--|
| Employee has reviewed action and route to be taken in the event of an emergency evacuation |  |
| Employee has reviewed names of emergency- fire officers in the area                        |  |
| Employee is aware of security procedures to be taken                                       |  |

### 3. Reporting Procedures

|   |  |
|---|--|
| Employee is aware of procedures for reporting accidents/incidents/potential hazards   |  |
| Employee has been shown the location of CASH and Institute of Technology Tallaght - Accident/Incident/hazards Notification Book |  |

### 4. Laboratory Safety

|  |  |
|--|--|
| Employee has reviewed the location and use of Spill Kits , the Eye-wash stations and Emergency showers |  |
| Employee has reviewed appropriate Personal Protective Equipment  |  |

### 5. Risk Assessments

|  |  |
|--|--|
| Employee has reviewed risk assessment and location of <i>Material Safety Data Sheet (MSDS)</i> |  |
|--|--|

### 6. General Rules

|  |  |
|--|--|
| Employee has reviewed hand washing/disinfection procedures     |  |
| Employee is aware of policy for working after hours            |  |
| Employee has reviewed the use of fridges/chillers/ freezers    |  |
| Housekeeping of working area/aisles/floor/doorways/ fume hoods |  |

### 7. Safe Working Practices

|   |  |
|---|--|
| Employee is aware of the appropriate labelling and correct storage of hazardous substances & dangerous chemicals/reagents/etc |  |
| Employee has reviewed waste disposal procedures   |  |
| Employee has been shown the location of Manufacture's Operations Manuals for equipment  |  |

## Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations

|  |  |
|--|--|
| Employee has read and understood all Standard Operating procedures (SOP) for relevant equipment/methods/etc. |  |
| Employee has reviewed the use of high pressure Equipment (e.g. autoclaves)                                   |  |
| Training required on specific equipment and/or procedures (complete training form) has been provided         |  |

Signed (staff): \_\_\_\_\_

Signed (supervisor): \_\_\_\_\_

Date: \_\_\_\_\_

## Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations

|  |           |            |        |
|--|-----------|------------|--------|
| Ref. No.   | Form- 7.1 | Issue Date |        |
| Version  |           | Page No.   | 7 of 2 |
| Section: Biological agents                               |           |            |        |
| Subject Title: Microorganism or infectious material Form |           |            |        |
| Authorised by  |           |            |        |

### Form 7.1 Microorganism or infectious material form

**Purpose:** For Level 2 Containment or operations which use Group 2/ Group 1 classified microorganisms and/or their toxic products.

Biological agents have been classified by the World Health Organization and these classifications have been adopted worldwide by various bodies, including the EU. These are included in the Safety, Health and Welfare at Work (Biological Agents) Regulations, 2013 and the relevant Code of Practice. The Code of Practice specifies three containment levels which correspond to hazard groups 2, 3 and 4

Definitions group organisms:

A **group 1 biological agent** or micro-organism is one that is unlikely to cause human disease (i.e. no or low individual or community risk). Other than requiring good hygienic procedures, this group is effectively outside the scope of the regulations.

A **group 2 biological agent** is one that can cause human disease and might be a hazard to employees, although it is unlikely to spread to the community and in respect of which there is usually effective prophylaxis (preventative measures) or treatment available (i.e. moderate individual risk, low community risk).

A **group 3 biological agent** is one which can cause severe human disease, presents a serious hazard to employees and where there is a risk of spreading to the community, though there is usually effective prophylaxis or treatment available (i.e. high individual risk, low community risk).

A **group 4 biological agent** is one which causes severe human disease and is a serious hazard to employees and which may present a high risk of spreading to the community and in respect of which there is usually no effective prophylaxis or treatment available (i.e. high individual and high community risk). See Schedules 2 & 3 of Biological Agents Code of Practice for details of containment level 4.

**Only microorganisms categorised as group 1 and 2 can be used in the Class II microbiology lab**

**1. Briefly but clearly describe use:**

**2. Briefly but clearly describe the Microorganisms being used, including Type collection numbers where applicable:**

## Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations

**3. Is any of the use likely to lead to genetic recombination, mutation or other alteration leading to a change in pathogenicity or to genetic recombination, mutation or alteration to any other micro-organism in the environment of the use? Yes No**

If Yes, describe:

(If Yes, also consult the Institute Regulations on Genetically Modified Microorganisms).

### **4. Others**

**a) Risk assessment carried out:**

**b) Containment facilities to be used (\*see above definition of group organisms and assigned containment levels)**

**c) Health hazards of the Use:**

**d) Proposed disposal method/s for waste:**

## Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations

|  |                   |            |        |
|--|-------------------|------------|--------|
| Ref. No.   | <b>Form - 7.2</b> | Issue Date |        |
| Version  |                   | Page No.   | 9 of 2 |
| <b>Section: Biological agents</b>                |                   |            |        |
| <b>Subject Title: Pathogen safety data sheet</b> |                   |            |        |
| Authorised by                                    |                   |            |        |

### Form 7.2 Pathogen Safety Data sheet

**Purpose:** To compile information on any new biological agent prior commencement of research activities

1. Infection agent
  - a. Name
  - b. Synonym
  - c. Characteristics
2. Hazard identification
  - a. PATHOGENICITY/TOXICITY
  - b. EPIDEMIOLOGY
  - c. HOST RANGE
  - d. INFECTIOUS DOSE
  - e. MODE OF TRANSMISSION
  - f. INCUBATION PERIOD:
  - g. COMMUNICABILITY
3. Dissemination
  - a. Reservoir
  - b. Zoonosis
4. Stability and viability
  - a. DRUG SUSCEPTIBILITY
  - b. DRUG RESISTANCE
  - c. SUSCEPTIBILITY/RESISTANCE TO DISINFECTANTS:
  - d. PHYSICAL INACTIVATION:
  - e. SURVIVAL OUTSIDE HOST:
5. First Aid Medical
  - a. Surveillance
  - b. First aid treatment
  - c. Immunisation
6. Laboratory hazards
  - a. LABORATORY-ACQUIRED INFECTIONS:
  - b. SOURCES/SPECIMENS
  - c. PROTECTIVE CLOTHING:
  - d. OTHER PRECAUTIONS:
7. HANDLING AND STORAGE
  - a. Disposal
  - b. Storage



## Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations

### c. Spills

#### **REGULATORY AND OTHER INFORMATION - ATCC datasheets**

# Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations

|  |          |            |         |
|--|----------|------------|---------|
| Ref. No.                                   | Form 7.3 | Issue Date |         |
| Version                                    |          | Page No.   | 11 of 6 |
| Section: Biological agents risk assessment |          |            |         |
| Subject Title: Agent risk assessment Form  |          |            |         |
| Authorised by                              |          |            |         |

## Biological Agents Risk Assessment Form

Persons completing this form should refer to the ITT Biosafety Manual

### 1. Name & Status of Person Carrying out Assessment

\_\_\_\_\_

### 2. Date of Assessment

\_\_\_\_\_

### 3. Location of Work

\_\_\_\_\_

### 4. Detail the Process Involving the use or risk of Exposure to Biological Agents

- Indicate the frequency and duration of the process, the materials to be handled and who will be carrying it out. If necessary attach a written procedure for the process.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### 5. Deliberate use of Named Biological Agent

Name of Agent \_\_\_\_\_

Type of Agent \_\_\_\_\_ (Bacteria, virus etc)

Classification of Agent \_\_\_\_\_ (Class 1-4)

Containment Required

## Appendix 14: Standard Operating Procedures/Forms for Class II Microbiology Laboratory Operations

| Containment Measures  | Implemented |
|---|-------------|
| 1. The workplace is to be separated from any other activities in the same building  |             |
| 2. Input air & extract air to the workplace are to be filtered using HEPA or otherwise                                    |             |
| 3. Access is to be restricted to nominated workers only   |             |
| 4. The workplace is to be sealable to permit disinfection   |             |
| 5. Specific disinfection procedures   |             |
| 6. The workplace is to be maintained at an air pressure negative to atmosphere  |             |
| 7. Effective vector control e.g. rodents & insects  |             |
| 8. Surfaces impervious to water & easy to clean   |             |
| 9. Surfaces resistant to acids, alkali, solvents, disinfectants   |             |
| 10. Safe storage of a biological agent  |             |
| 11. An observation window, or alternative, is to be present, so that occupants can be seen                                |             |
| 12. A laboratory is to contain own equipment  |             |
| 13. Infected material including any animal is to be handled in a safety cabinet or isolator or other suitable containment |             |
| 14. Incinerator for disposal of animal carcasses  |             |

Ticking a containment measure indicates its implementation. Please see Appendix 1. for mandatory containment measures.

**6. Is specialist training required before this process commences?** Yes  No

**7. List persons likely to be Exposed to biological Agents:**

---



---

**8. Indicate Potential Routes of Exposure**

- |  |  |
|--|--|
| Ingestion of the Agent <input type="checkbox"/>      | Inhalation of the Agent <input type="checkbox"/> |
| Entry via Mucosal Membranes <input type="checkbox"/> | Subcutaneous Entry <input type="checkbox"/>      |
| Entry via Damaged Skin <input type="checkbox"/>      | Physical Contamination <input type="checkbox"/>  |

**9. Potential Health Effects of Biological Agent(s)**

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**10. Risk Control Measures to Allow Safe use of Agent(s)**

**10.1 PPE Required**

- |                                   |   |
|-----------------------------------|---|
| Lab Coat <input type="checkbox"/> | Safety Glasses <input type="checkbox"/> |
|-----------------------------------|---|

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Safety Goggles  Face Shield

Gloves  Other (give details) \_\_\_\_\_

### 10.2 Engineering Controls Required

Safety Cabinet  Other (give details) \_\_\_\_\_

### 10.3 Emergency Responses

#### First Aid Responses

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#### Spill Responses

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Suitable Disinfectant \_\_\_\_\_

### 10.4 Good Hygiene Practices

No Eating or Drinking in work place

Hand Washing Facilities Available

Mandatory washing of exposed skin after work completed

Covering of cuts & abrasions

No insertion of objects into mouths etc

10.5 Vaccination Required No  Yes (give details) \_\_\_\_\_

### 10.6 Further Risk Control Measures required to Eliminate / Minimise Identified Routes of Exposure.

The following should be considered:

1. The design of work practices so as to minimise potential for contact with biological agents
2. Ongoing health screening for affected persons if deemed necessary
3. The formulation and implementation of local codes of practice for the safety of personnel where required, especially for the taking, handling and processing of samples of human or animal origin
4. The display of warning notices where necessary
5. The keeping of adequate records of persons potentially exposed to infectious agents where deemed necessary

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6. The drawing up of plans to deal with accidents involving a biological agent.
7. The testing, where it is necessary and technically possible, for the presence, outside the primary physical confinement, of a biological agent used at work.
8. The use of means for the safe collection, storage and disposal of waste by employees, including the use of secure and identifiable containers, after suitable treatment where appropriate.
9. The making of arrangements for the safe handling and transport of a biological agent within the workplace.
10. The removal of sharps from the workplace
11. The implementation of Universal Precautions for handling blood products
12. The restriction of access to the workplace
13. Pregnant employees
14. Equipment requirements
15. Sharps issues
16. Lab animal issues
17. Additional hygiene control measures

Details

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### 11. Risk Rating

#### Assessment of Severity

High (H) = Very Harmful

Medium (M) = Harmful

Low (L) = Slightly Harmful Severity

#### Assessment of Likelihood Of Exposure

High (H) = Very Likely

Medium (M) = Likely

Low (L) = Unlikely

Likelihood

**Risk = Severity x Likelihood**

#### Severity

|   | L | M | H |
|---|---|---|---|
| L | 1 | 2 | 3 |
| M | 2 | 3 | 4 |
| H | 3 | 4 | 5 |

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**RISK RATING:** \_\_\_\_\_

**Shaded Area = Risk Rating**

1. **Trivial Risk:** No further action needed
2. **Acceptable Risk:** No additional risk control measures required
3. **Moderate Risk:** Implement further risk control measures if possible
4. **Substantial Risk:** Further control measures must be implemented. If this is not possible then work must be strictly managed to ensure safety.
5. **Intolerable:** Work must be prohibited until further control measures are implemented.

**Is the risk rating acceptable:** Yes  No

If yes sign and date below and ensure all risk control measures have been implemented. If no identify further control measures and reassess risk. If the risk cannot be reduced to an acceptable level then process cannot be carried out.

**Signed:**

**Date:**

**Position:**

\_\_\_\_\_

**Is the process suitable for lone working:** Yes  No

**12. Notification to the Health and Safety Authority Required** Yes  No

**13. Signature of the Head of Department**

**Signed:**

**Date:**

\_\_\_\_\_

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|   |                |            |  |
|---|----------------|------------|--|
| Ref. No.  | <b>SOP 9.1</b> | Issue Date |  |
| Version   |                | Page No.   |  |
| <b>Section Laboratory safety</b>                |                |            |  |
| <b>Subject Title: Emergency wash facilities</b> |                |            |  |
| Authorised by                                   |                |            |  |

**Policy:**

Staff should be trained and familiar with what actions should be taken in the event of accidental exposure to potentially hazardous materials.

**Purpose:**

To reduce the possibility of personal injury

**Key Elements:**

- Eyewash facilities

**Procedure:**

|                           |  |
|---------------------------|--|
| <b>Eyewash Facilities</b> | <p><b>Know location of eyewash facilities and how to use them.</b></p> <p>If eye protection fails, go to eyewash facility:</p> <p><b>Eyewash station (Sterile Isotonic Eyewash Solution)</b></p> <ul style="list-style-type: none"> <li>• If the victim is a contact lens wearer and the lenses cannot be removed immediately, wash for one minute, then continue washing for a total of 15 mins.</li> <li>• They must be inspected once weekly and documented</li> <li>• <b>Seek medical attention immediately thereafter.</b></li> </ul> |
|---------------------------|--|



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|  |         |            |  |
|--|---------|------------|--|
| Ref. No.                                       | SOP 9.2 | Issue Date |  |
| Version  |         | Page No.   |  |
| <b>Section: Laboratory Safety</b>              |         |            |  |
| <b>Subject Title: Biological Spill Control</b> |         |            |  |
| Authorised by                                  |         |            |  |

### **Policy:**

Assure protection for visitors, staff and property from hazardous or potentially hazardous biological spills. Fast a safe procedures for cleaning of hazardous spills.

### **Purpose:**

In the event of a spill, competent, prompt action is necessary for immediate clean-up to reduce and eliminate the hazards present.

### **Responsibility:**

Management and employees

### **Key Elements:**

- Small spill
- Large spill
- Management of an accidental biohazardous spill depends on the infectious agent, the quantity of the material and whether an aerosol was produced.

### **Procedure:**

#### **Small Spill**

1. If the spill is in a public area such as a corridor, warn others to leave and start the clean up immediately.
2. Use appropriate personal protective equipment (laboratory coat, gloves, face protector shield or goggles, etc.).
3. Use forceps or heavy gloves to pick up any broken glass and discard into a sharps container.
4. Cover spill with paper towels to avoid splashing during the addition of disinfectant.
5. Squirt disinfectant (1% Virkon) onto paper towels and with circular motion move from the outside towards the centre.
6. Let stand for 30 minutes.
7. Clean up paper towels and place them in a yellow biohazard bag.
8. Disinfect contaminated surface with Virkon and wipe with additional paper towels. Place paper towels in a yellow biohazard bag.
9. Wash hands.

#### **Large Biological Spill (possible aerosol formation)**

1. Any individual involved in the clean-up of a spill must determine the nature of the spill and the appropriate clean-up procedure before beginning clean-up.
2. Hold breath, alert others, leave the area and close the door.
3. If the spill is in a public area such as a corridor, warn others to leave.

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4. After 30 minutes, when aerosols have settled, enter the area to begin cleanup.
5. Obtain the spill control materials.
6. Use appropriate PPE (gloves, gowns, face shield or goggles, footwear).
7. Use forceps or heavy gloves to pick up any broken glass and discard into a sharps container.
8. Cover the spill with disposable absorbent material (paper towels or spill control pillows) or encircle the spill to prevent spreading.
9. After absorption of the liquid, discard contaminated material into a yellow biohazardous bag.
10. Follow disinfection procedure as for a small spill.
11. Inform the Supervisor or designate. Document the spill on the Employee Incident Form. (See appendix 8/9 CASH-Synergy Ancillary Safety Statement).

### **Cleanup of Spills in Biological Safety Cabinet**

1. Leave fan ON.
2. Cover spilled material with paper towels.
3. Gently pour disinfectant onto paper towels, working with a circular motion, from the outside to the center.
4. Wait 10-30 minutes, then remove with forceps.
5. Repeat the above steps.
6. If spilled material goes through perforated work surface or grills to catch tray below, pour disinfectant to dilute spill tenfold.
7. Let stand, drain through drain cock and clean.

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|   |         |            |  |
|---|---------|------------|--|
| Ref. No.  | SOP 9.3 | Issue Date |  |
| Version   |         | Page No.   |  |
| <b>Section: Laboratory safety</b>                       |         |            |  |
| <b>Subject Title: - Handling broken glass and tubes</b> |         |            |  |
| Authorised by   |         |            |  |

**Policy:**

Assure protection for visitors, staff and property from hazardous or potentially hazardous broken glass and tubes. Procedures are provided for fast and safe means of containment and clean up of hazardous spills

**Purpose:**

In the event of a breakage, competent, prompt action is necessary for immediate clean-up to reduce and eliminate the hazards present.

**Responsibility:**

Management and employees

**Key Elements:**

- Broken Glass and Tubes
- Broken Tubes in Centrifuge

**Procedure:**

**Broken Glass and Tubes**

1. Never handle broken glass or tubes with your hands. Use forceps only.
2. Dispose of broken tubes or contaminated glass in a sharps container. Never dispose of broken glass into the regular garbage.
3. Decontaminate as outlined in Biological or chemical spill control
4. Non-contaminated broken glass can be gathered using a broom and dustpan and dispose into a sharps container or broken glass box.
5. If you experience a skin puncture with a contaminated sharp, follow the protocol as outlined in Accidental Occupation Exposure (Form page 56-57 CASH Ancillary Safety Statement.

**Broken Tube(s) in Centrifuge**

1. Turn OFF centrifuge
2. If in sealed safety buckets, proceed to step 7. If in unsealed cups, inform others in vicinity and DO NOT open the centrifuge for 30 minutes to allow aerosols to disperse or settle
3. Slowly open centrifuge lid, remove all broken tubes, buckets, rotors, etc. to a basin of disinfectant which is non-corrosive; let stand for time recommended for selected disinfectant. Alternatively, these items may be autoclaved
4. Place any unbroken capped specimens in disinfectant for 60 minutes and then remove, rinse, and process
5. Wipe down the bowl of the centrifuge twice with disinfectant and rinse with water; dry.
6. Dispose of wipe-down cloths as infectious
7. Remove sealed bucket to biological safety cabinet
8. If any tubes are broken, leave in bucket, replace lid of bucket loosely and autoclave entire contents or place in disinfectant (see steps 3 & 4)

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|   |         |            |  |
|---|---------|------------|--|
| Ref. No.  | SOP 9.4 | Issue Date |  |
| Version   |         | Page No.   |  |
| <b>Section: Laboratory Safety</b>                                   |         |            |  |
| <b>Subject Title: Cleaning activities Class II Microbiology lab</b> |         |            |  |
| Authorised by   |         |            |  |

### **Policy:**

Establishing cleaning activities for Class II facilities

### **Purpose:**

To provide instructions relating to cleaning activities in Class II laboratories.  
It is established which cleaning activities are carried out by Research / Technical staff.

### **Responsibility:**

Research / Technical staff is to be aware with the instructions relating to cleaning activities in Class II laboratories.

### **Procedure:**

The following rules are applicable to the cleaning:

- Research / Technical staff is to wear a white coat and disposable gloves during the cleaning activities.
- The floors are to be wet cleaned once a week (possibly during own duty chores), optionally alternating a (chlorite) disinfectant per week and water and soap the other week.
- It is required to use separate cleaning tools for contained spaces (separate trolleys). These are not to be used in other labs.
- The water used for cleaning activities is to be removed after use in the sink of the laboratory in question.
- It is not allowed to remove containers for biological waste from the laboratory.
- Only the waste packed in waste bags may be removed by cleaning staff. Removal is to take place twice a week.
- Any heaped waste, as well as gloves worn, are to be considered as contaminated waste and must therefore be put into the containers for biological waste in the laboratory.

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|   |         |            |  |
|---|---------|------------|--|
| Ref. No.  | SOP 9.5 | Issue Date |  |
| Version   |         | Page No.   |  |
| Section: Laboratory safety                            |         |            |  |
| Subject Title: - Safe storage of infectious materials |         |            |  |
| Authorised by   |         |            |  |

## Policy

Standards and Guidelines procedures for safe material storage conditions.

## Purpose

This policy will eliminate or reduce the risk of an accidental release or contamination of the infectious materials and protect laboratory personnel who handle these infectious materials from exposure.

## Responsibility

Management and employees

## Procedure

- Samples of infectious materials are stored in 2.0ml vials at -80 degrees Celsius.
- Vials are leak-proof, impact resistant and are housed in thermal boxes with fitted lids (*freezer box*).
- Freezer boxes and vials are labeled accordingly.
- When moving full or multiple freezer boxes ensure lids are securely fitted and boxes are loaded in a manner that will prevent tipping during movement.
- Ensure freezers locked securely.

Pathogen log and ATCC

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|  |         |            |  |
|--|---------|------------|--|
| Ref. No.   | SOP 9.6 | Issue Date |  |
| Version  |         | Page No.   |  |
| <b>Section: Laboratory safety</b>  |         |            |  |
| <b>Subject Title: - Infection Control Policy for Management of Bio-hazardous Waste</b> |         |            |  |
| Authorised by  |         |            |  |

### 1.0 POLICY

It is the policy of the School of Science that only staff trained in the safe disposal of bio-hazardous waste should perform this task. The objectives of this policy are to:

- Provide written guidelines on the management of bio-hazardous waste.
- To educate all staff about the categories of bio-hazardous waste.
- To educate all staff in the proper management of bio-hazardous waste including handling, storage, transportation, treatment and disposal of bio-hazardous waste.
- To improve the segregation of waste particularly between bio-hazardous waste and non-risk waste.
- To ensure the safety of personnel involved with laboratory waste.
- To ensure that a good tagging system is in place for traceability and accountability.

### 2.0 PURPOSE

The purpose of this protocol is to outline to School of Science staff the correct procedure for the management of bio-hazardous waste. Every effort should be made by the Institute to minimise waste and to take account of recycling strategies.

### 3.0 ORGANISATIONAL UNITS AFFECTED

All employees and researchers in the School of Science who are involved with the handling, storage, transportation, treatment and disposal of bio-hazardous waste.

### 4.0 DEFINITIONS

HOD: this denotes Head of Department.

HOS: this denotes Head of School.

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**Hazardous Waste:** This is waste, which is potentially hazardous to those who come in contact with it by nature of its infectious, biological, chemical content, or by being categorized as a sharp.

**Non-hazardous waste:** This is waste, which is not hazardous to those who come in contact with it. Its contents are non-infectious and non-chemical. Examples of such waste are tissues used to dry hands.

**Infectious:** Infectious substances are defined as substances contaminated with viable micro-organisms or their toxins which are known or reliably believed to cause disease in man or other living organisms.

**Bio-hazardous Waste:** This is waste that might potentially contain an infectious agent and may include cultures and/or stocks of infectious agents, cell cultures, biological samples (including food used in experiments), and any other material and contaminated equipment which might pose danger of infection.

## 5.0

### RESPONSIBILITY

5.1 It is the responsibility of the Head of School of Science and the Head of Department of Applied Science to ensure compliance to this protocol.

5.2 Persons involved in the production and handling of bio-hazardous waste must follow this policy as outlined.

5.3 Technical support staff must ensure that all waste contracts are managed accordingly and all documentation, including C1 forms, are correctly filled in and all records maintained for a period of 5 years.

## 6.0

### SAFETY PRECAUTIONS

All bio-hazardous waste must be handled with care. Safety glasses, white coat and gloves should be worn when handling un-autoclaved material.

## 7.0

### PROCEDURES

#### 7.1 CATEGORIZATION OF LABORATORY WASTE.

Laboratory waste can be divided into two categories

- Hazardous Waste
- Non-hazardous Waste

##### 7.1.1 CATEGORIZATION OF HAZARDOUS WASTE

Hazardous waste can be segregated into a number of different streams;

- Infectious/Bio-Hazardous.
- Chemical, Toxic or Pharmaceutical including Cytotoxic.



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-Sharps (e.g. needles, broken glassware).

-Radioactive.

### 7.1.1.1 INFECTIOUS / BIO-HAZARDOUS WASTE

This is waste arising from the laboratories, containing substances with viable micro-organisms or their toxins, which are known or reliably believed to cause disease in man or other living organisms. Examples of this waste include cultures and/or stocks of infectious agents, cell cultures, biological samples (including food used in experiments), and any other material and contaminated equipment which might pose danger of infection. Under ADR regulations infectious substances are divided into 4 Risk Groups. Only Risk Group 1 and 2 are permitted in the Institute. These are defined as follows;

**Risk Group 1:** These micro-organisms are unlikely to cause human or animal disease and therefore present a very low individual or community risk

**Risk Group 2:** This is a pathogen that usually causes human or animal disease but does not ordinarily spread from one infected individual to another and for which, effective treatment and preventative measures are available and the risk of spread of infection is limited. These micro-organisms therefore present moderate individual and low community risk.

### 7.1.1.2 CHEMICAL, TOXIC AND CYTOTOXIC WASTE

This is waste arising from the laboratories, containing substances of varying toxicity which can cause damage to human health by inhalation, by cutaneous adsorption or by ingestion.

### 7.1.1.3 SHARPS

A sharp is defined as any object that has been in contact with a hazardous waste and that is likely to cause a puncture, wound or cut to the skin. Examples include needles and contaminated broken glass.

### 7.1.1.4 RADIOACTIVE

Radioactive waste which includes materials in excess of authorized clearance levels, classified as radioactive under General Control of Radioactive Substances Order 1993 (SI 151 of 1993). The Institute is not a producer of radioactive waste.

### 7.1.2 NON-HAZARDOUS WASTE

This is waste which is non-infectious and non-chemical in nature. Examples include paper hand towels and packaging.

### 7.2 DISPOSAL METHOD

The Institute use a Clinical Waste Thermal Plant to treat and dispose of bio-hazardous waste. The company:

- Collects the waste fortnightly from the Institute.

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- Replace the wheeled bins with clean empty bins that have been steam cleaned.
- If the bio-hazardous waste is designated for incineration e.g. cytotoxic or chemically contaminated waste, the company collects the waste and sends it abroad for incineration. Otherwise a non-incineration method is used to treat the waste for example;
  - Autoclave the bio-hazardous waste (to render non-infectious)
  - Shred
  - Bale
  - Wrap
  - Send for Landfill

Non-hazardous waste: this waste is sent to landfill. Segregation of waste is therefore important to ensure that the correct disposal route is adhered to.

### 7.3 SEGREGATION OF WASTE

Segregation at the point of origin, aided by suitable packaging and labelling, is vital in enabling different forms of waste to be handled, transported and disposed of in a manner which is safe and in keeping with the nature of the waste.

The first level of segregation is between hazardous and non-hazardous waste (See Appendix A) and this should be done at the point of generation. Lecturers and demonstrators should impress on under-graduate students the safety implications of placing hazardous waste into the grey domestic wheeled bins. Also filling autoclave bags with paper towels that have been used to dry hands adds significant cost onto the Institute as cost of disposal is based on weight.

### 7.4 PACKAGING

Good packaging is essential to ensure that little or no hazard is presented to those whose job it is to handle, transport and dispose of laboratory waste. Packaging should conform to ADR specifications which set out minimum requirements for leak resistance, strength, penetration and tear resistance. Technical support staff must ensure that any packaging including yellow bags for autoclave waste, rigid containers, containers for sharps and intermediate bulk containers (IBCs) must be UN approved and appropriate for the type of waste it will hold. The Institute is responsible for the waste until it is incinerated or sent to landfill. Appendix B gives details of packaging.

#### 7.4.1 ADR REGULATIONS

Transport of goods by road must conform to the requirements of the UN/European Agreement concerning the Carriage of Dangerous Goods by Road (ADR) 2001 and the ADR Framework Directive, 94/55/EC. When waste is being shipped abroad, packaging must conform to the requirements of the International Maritime Institute's Dangerous Goods Regulations.

The basis of ADR is the classification of dangerous substances into 9 different classes according to the hazard involved. Annex A contains of ADR gives details of classification, packaging, labelling and documentation of the 9 different classes of dangerous substances. A detailed list

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of dangerous substances is listed and each is given a 4 digit "UN Number" followed by the proper shipping name for that substance. Two classes of substances specifically concern bio-hazardous waste; Class 6.1 Toxic Substances and Class 6.2 Infectious Substances.

Substances are divided into 3 packing groups, I, II, and III, in accordance with the degree of danger they present. Clinical waste assigned to UN 3291 is assigned to packing group II. All UN approved packaging are stamped with a specific UN marks.

e.g. 5H4/Y15/S/98/GB3558

The first part indicates the type of container (5H4 is a plastic bag, 4H2 is a solid plastic box). The second part refers to the packing group(s). X = Packing Group I, II or III; Y = Packing Group II or III; Z = Packing Group III. Therefore packing for clinical waste should have X or Y displayed. The 'S' in the next part of the code denotes that it is intended for the use of solids or inner packaging. The next part indicates the year in which it was produced (in this case 1998) and the final part indicates the place of production (Great Brittan in this instance). Any person involved in the purchasing of packaging for bio-hazardous waste must ensure that it is UN approved and suitable for Packing Group II, i.e. have X or Y marked on the outside. Recommended packaging types are detailed in Appendix D.

Each outer container intended for use as UN packaging must carry a specific diamond-shaped hazard label and a further label giving specific information about the contents. For Class 6.2 the hazard label must indicate the bio-hazardous symbol and the class number, 6. The information label must contain the 4 digit UN number of the product contained, e.g. UN3291, and include the Proper Shipping Name as listed in ADR Dangerous Goods List.

Under Part 3 – Duties of carrier – of ADR, vehicles used for the carriage of dangerous goods must be certified to the requirements laid down in ADR. A 'B3 Certificate' is issued from the Department of Transport following satisfactory inspection. The driver must hold this valid certificate of approval for the transport unit along with written instructions from the consignor relating to appropriate actions to be taken in the event of accidents/incidents. Vehicles must be equipped with spillage cleaning kits and appropriate personal protective equipment. The transport unit must be marked, labelled and placarded in accordance with ADR. The Driver must also have an ADR Training Certificate for Drivers of Vehicles Carrying Dangerous Goods issued by the Health and Safety Authority. These certificates along with the Waste Collection Permits, Waste Licence, Tax Clearance Certificates, and Public Liability Insurance are mandatory for any carrier of dangerous goods and technical support staff must ensure that they are included in any tender for the collection of bio-hazardous waste. A sample tender is included in Appendix 5.

### 7.4.2 PRIMARY PACKAGING

Primary containers are designed for the initial containment of waste. For non-hazardous waste it consists of the clear plastic bags that line the grey wheeled bins located in the teaching and research laboratories.

Types of packaging for hazardous waste is as set out below

- Yellow Bags (Disposal by autoclaving)
- Yellow Rigid Containers with Yellow Lids (Disposal by autoclaving)

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- Yellow Sharps Containers (Disposal by autoclaving)
- Yellow Sharps Containers with Purple Lids (Disposal by incineration)
- Yellow Rigid Containers with Purple Lids (Disposal by incineration)
- Grey Clinisafe Container with yellow Lids (Special Disposal if contain Mercaptoethanol)

The following are criteria for each type and form of waste:

(a) AUTOCLAVE BAGS:

Type: Light blue or clear with appropriate blue lettering.

Contents: Laboratory waste that requires autoclaving. After autoclaving the bag should be placed in yellow bags, rigid containers or sharps container as appropriate.

(b) YELLOW BAGS:

Type: Yellow plastic, securely closed when 2/3 full.

Contents: Any items contaminated with bacterial or tissue culture waste e.g. gloves, universal, tissue culture plates etc. Bags should not contain any free liquids nor any items which may tear the bag e.g. glass or sharp items nor shall they contain chemical or cytotoxic waste.

(c) YELLOW RIGID CONTAINERS WITH YELLOW LIDS:

Contents: Material containing free liquids, certain laboratory waste but not sharps which could puncture the wall. They shall not contain chemical or cytotoxic waste.

(d) YELLOW SHARPS CONTAINERS WITH YELLOW LIDS:

Contents: All sharps excluding chemical or cytotoxic waste. Broken glassware and needles and syringes that were in contact with bio-hazardous waste should be placed in this container.

(e) YELLOW SHARPS CONTAINERS WITH PURPLE LIDS:

Contents: Needles, syringes and broken glassware that was in contact with chemicals or cytotoxic waste.

(f) YELLOW RIGID CONTAINERS WITH PURPLE LIDS:

Contents: Non-sharps cytotoxic waste such as plastic pipettes, universals, ELISA plates that were in contact with cytotoxic material.

(g) GREY CLINISAFE CONTAINER WITH YELLOW LIDS:

Contents: These containers have a fluid tight adhesive seal and can be used to contain cytotoxic material. In the institute we use them for microfuge tubes that may contain phenol/chloroform extracts or sample buffer for SDS PAGE. However disposal methods are very different and therefore these containers must be labelled clearly on the outside.

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The phenol/chloroform microfuge tubes can be disposed in a similar way to other chemical waste. Sample buffer that contains 2-Mercaptoethanol cannot be disposed through all waste disposal companies as it produces a noxious smell on incineration and certain incineration plants will have controls in place with respect to smells. Technical support staff must check with the waste disposal company before disposal of these containers.

### 7.4.3 SECONDARY PACKAGING

The use of UN approved wheeled bins for the internal movement of laboratory waste is seen as the best way to avoid unnecessary secondary handling of primary containers. They also act as an additional containment.

Bio-hazardous waste is placed inside the wheeled bins which are lined with a plastic bag. The grey wheeled bins with the yellow lids are for bio-hazardous waste only. The red wheeled bins are for cytotoxic waste only. Yellow bags and yellow rigid/sharp containers with yellow lids can all be placed in the grey wheeled bin with the yellow lid. Yellow rigid/sharp containers with purple lids must only be placed in the red wheeled bin. Chemical or cytotoxic waste should never go into the bio-hazardous wheeled bin.

Once the interior bag is full, the bag should be sealed with the cable tie provided. The tying of the interior bag is important to enable the more efficient and effective method of disposing of the waste into the autoclave at the waste plant. Wheeled bins must not be filled beyond the point where closure of the lid is obstructed or causes the contents to be squashed.

The wheeled bin can now be closed and sealed. Some of the wheeled bins are sealed with cable tie while others have a ratchet mechanism. If you are unsure how to close the wheeled bin then help should be sought from the technical support staff.

Under ADR packaging requirements the wheeled bin is classified as an IBC and therefore the hazard label 'INFECTIOUS SUBSTANCES CLASS 6' appearing in a diamond should be displayed on two opposite sides. The waste producer should have these labels affixed but the technical support staff should check that the correct labelling is displayed.

### 7.4.4 TRACEABILITY

The wheeled bins are traced using a barcode system. The disposal company have supplied labels that are attached by the technical staff to the wheeled bin for traceability purposes. Two labels are supplied; the yellow label is affixed to the grey wheeled bin with the yellow lid and the purple label is affixed to the red wheeled bin. When the waste collector is collecting the waste, the barcode is scanned thus providing a traceable record for all the waste produced by the Institute.

## 7.5 MANAGEMENT OF LABORATORY WASTE

### 7.5.1 GENERAL

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It is essential that good laboratory procedures apply to the management, packaging and handling of all wastes generated in the laboratories. Where considered necessary for the prevention of disease laboratory, waste should be autoclaved prior to disposal. In any event, laboratory waste in which Risk Group 2 organisms have been artificially cultivated to significantly elevated numbers (e.g. culture plates in microbiology) should be autoclaved prior to disposal.

Under no circumstances should glassware such as bottles, slides etc. be placed in plastic bags even if autoclaved beforehand.

### 7.6 COLLECTION, STORAGE AND HANDLING OF BIO-HAZARDOUS WASTE

#### 7.6.1 GENERAL

Under no circumstances should waste be compacted, either manually or mechanically. It is imperative that the Chemical/Cytotoxic and the Bio-hazardous waste are not mixed or conveyed together. Similarly it is imperative that hazardous waste must not be mixed with general domestic waste.

#### 7.6.2 COLLECTION

Once the wheeled bins are sealed they can be wheeled down to the Science service yard located at the back of the pilot plant. When one wheeled bin is full the bin should be brought down to the service yard and another empty bin collected. This will prevent a number of wheeled bins building up in the laboratories and potentially causing a fire hazard by blocking escape routes. The responsibility of transporting the wheeled bins lies with the technical support staff and those involved in research.

#### 7.6.3 STORAGE

The wheeled bins can be stored in the corridor beside the autoclave room and research in the biology laboratory so that primary waste packages can be placed in them directly after removal from the autoclave. Ensure that they are firstly placed in the yellow bags and sealed before placing in wheeled bin.

The wheeled bins can be stored in the boiler house in the Science service yard until collected by the waste producer. As the service yard has lockable gates it provides a reasonably secure location for the waste in order to minimise interference by unauthorised persons, children or animals. It also provides easy access to collection vehicles. Appropriate warning signs indicating the presence of bio-hazardous waste, restricting access to the public are prominently displayed on the doors of the boiler house.

#### 7.6.4 MANUAL HANDLING

Appropriate manual handling should be provided to those personnel placing primary waste into wheeled bins. In the case of the load being excessive, for pregnant personnel or persons not trained in manual handling then 2 people should share the load.

#### 7.6.5 COLLECTION BY WASTE CONTRACTOR

Waste is collected fortnightly unless otherwise arranged with the waste contractor. Four wheeled bins for bio-hazardous waste and one red bin for Chemical/Cytotoxic waste are kept on the Institute. If more wheeled bins are required or if the frequency of collection needs to



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be increased, the technical support staff will contact the waste contractor. All wheeled bins are cleaned by the waste contractor at least 6 times per year or if otherwise indicated.

### 7.7 RECORD MAINTENANCE

#### 7.7.1 DISPATCH NOTES AND CI FORMS

When the waste contractor collects the wheeled bins the barcodes on the bins are scanned. The waste contractor then provides the Institute with a despatch note showing details of each bin by barcode. This record must be maintained by the technical support staff, not only for invoicing and account purposes, but also as a record for the purpose of traceability and accountability. Despatch notes should be maintained for a period of 5 years.

On despatch of waste, the Institute, as consignor of Dangerous Goods, must complete Part A of the C1 Form required by the Waste Management Regulations. Technical support staff completes Part A of the C1 form and witnesses Part B of the form when the waste carrier company collects the waste. Technical support staff must also ensure that all records are given to the HOD for archiving. An example of a completed C1 Form is detailed in Appendix C. Copies of the C1 forms must be retained by the Institute in accordance with the requirements of the regulations for a period of 5 years. C1 Forms can be obtained from South Dublin County Council. A C1 form must be completed for each shipment of infectious risk waste. The note must accompany the load at all stages of carriage.

Please note that the EWC code 180108 is for cytotoxic waste and must only be included if cytotoxic waste is being removed. The EWC codes are listed below. A full list of the EWC codes are available from the technical support staff.

#### **European Waste Catalogue (EWC) and Hazardous Waste List Codes**

#### **18 Wastes from Human or Animal Healthcare and/or Related Research (except kitchen and restaurant wastes not arising from immediate health care)**

##### **1801 Wastes from natal care, diagnosis, treatment of disease in humans**

180101 Sharps (except 180103)

180103\* Waste whose collection and disposal is subject to special requirements in order to prevent infection

180106\* Chemicals consisting of or containing dangerous substances

180108\* Cytotoxic and cytostatic medicines

##### **1802 Wastes from research, diagnosis, treatment or prevention of diseases involving animals**

180202\* Waste whose collection and disposal is subject to special requirements in order to prevent infection

180205\* Chemicals consisting of or containing dangerous substances

Note: Any waste marked with an asterisk is considered as hazardous waste.



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## 8.0 LEGISLATION AND TENDERING PROCESSES

### 8.1 TRANSPORTATION REGULATIONS

Transportation of hazardous waste is governed by several sets of regulations dealing with different concerns relating to the materials transported. The main regulations are;

- The Carriage of Dangerous Goods by Road Regulations, 2001 (S.I. No. 492 of 2001)
- The European Communities (Safety Advisers for Transport of Dangerous Goods by Road and Rail) Regulations, 2001 – S.I. No. 6 of 2001
- S.I. No. 147 of 1998 – Waste Management (Movement of Hazardous Waste)
- The Waste Management (Collection Permit) Regulations, 2001 (S.I. No. 402 of 2001)

#### 8.1.1 Carriage of Dangerous Goods by Road Regulations, 2001 (S.I. N. 492 of 2001)

The European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) regulations are aimed at improving the safety in the transportation of all types of dangerous goods within EU Member States. In Ireland the Health and Safety Authority enforces that these regulations. Similar, but not identical rules apply to the transportation of hazardous waste by sea, rail and air.

S.I. No. 492 is divided into 12 parts. Part 2 details the duties of consignor of dangerous goods. Part 2 is mainly concerned with the packaging, marking and labelling of dangerous goods for each ADR class. Packaging must conform to the provisions of ADR relating to design, construction, type approval, inspection, maintenance, operation, filling and use. The packaging must be unaffected by the contents or the conditions of transport. Packaging must be marked and labelled in accordance with ADR.

#### 8.1.2 Dangerous Goods Safety Adviser (DGSA)

The European Communities (Safety Advisers for Transport of Dangerous Goods by Road and Rail) Regulations, 2001 – S.I. No. 6 of 2001 place an obligation on an undertaking to appoint a DGSA. The advisor is responsible for helping to prevent the risks inherent in such activities with regard to persons, property and the environment. The appointment must be agreed by both parties in writing.

#### 8.1.3 Consignment Notes – C1 Form

S.I. No. 147 of 1998 – Waste Management (Movement of Hazardous Waste) Regulations stipulates that the consignor of any hazardous waste must complete a consignment note. The waste is also required to be transported in properly labelled packaging. The consignment note is intended to enable the local authorities to keep track of the movement of hazardous wastes at all stages from production to disposal.

The consignment note is issued by the local authorities in whose functional area the waste originates. The consignment note is in 3 parts, A, B and C, and comprises 5 bound and numbered copies. The consignor is obliged to complete Part A and give the top 4 copies to the carrier. The carrier, in turn completes Part B before finally passing to the consignee who must return the form to the local authority after completing Part C.

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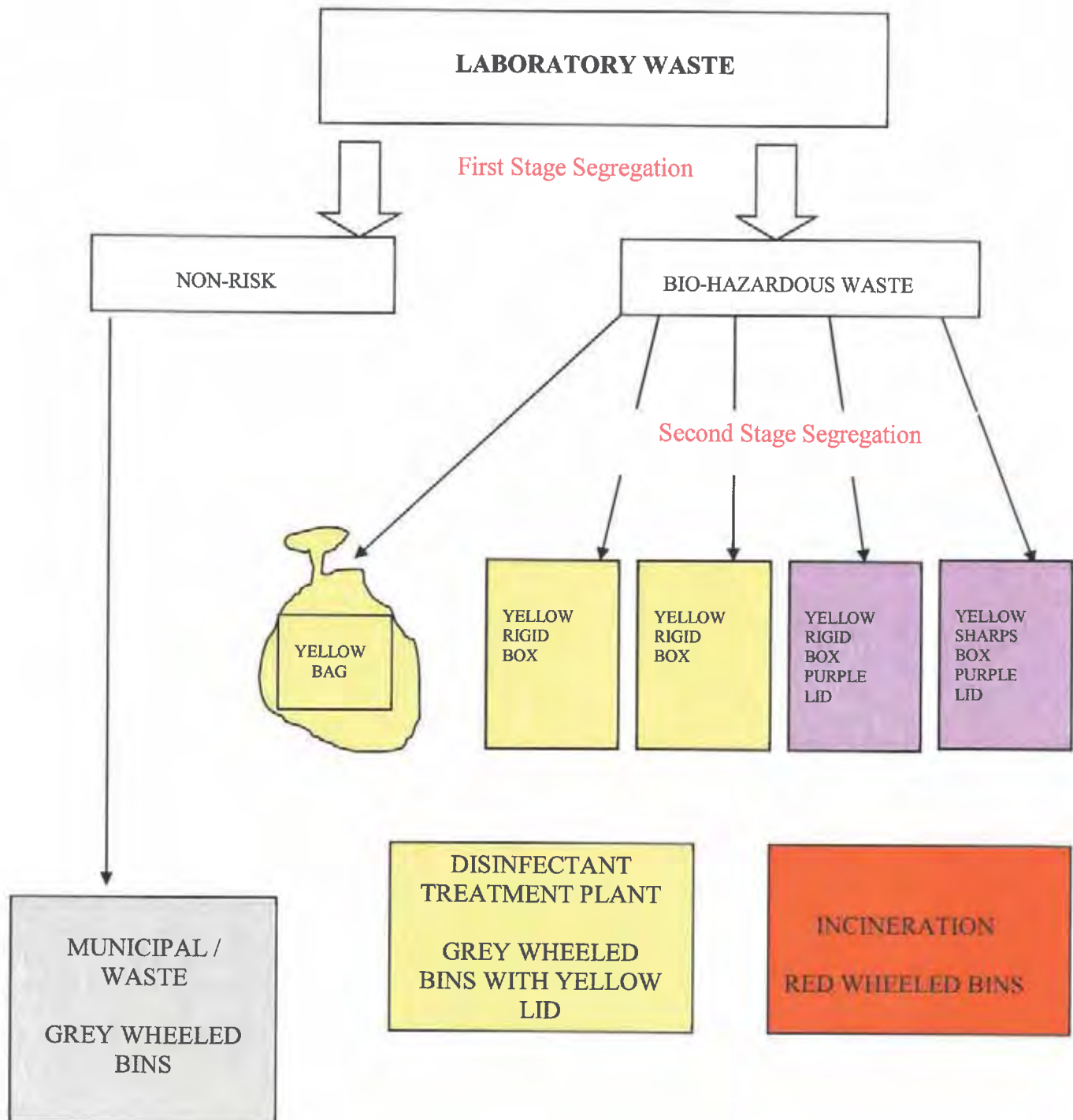
A consignment note must be raised for each shipment of infectious waste. The note must accompany the load at all stages.

### 8.1.4 Waste Management (Collection Permit) Regulations, 2001

Waste collection is now subject to Regional Waste Collection Permits. The permits are issued by the regional waste authorities under the Waste Management (Collection Permit) Regulations, 2001 (S.I. No. 402 of 2001). The regulations allow the waste authorities to monitor and control carriers and the movement of waste. The consignor must ensure that the carrier holds the appropriate waste collection permits for the areas that the waste is being transported in.

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## Appendix A Segregation of Waste



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## Appendix B

| CONTAINER TYPE               | YELLOW BAGS   | YELLOW RIGID CONTAINERS WITH YELLOW LIDS                                      | YELLOW SHARPS CONTAINERS   | YELLOW RIGID CONTAINERS WITH PURPLE LIDS    | YELLOW W SHARPS CONTAINERS WITH PURPLE LIDS  | GREY CLINISAFE CONTAINER WITH YELLOW LIDS   |
|------------------------------|---|---|--|---|--|---|
| <b>CONTAINER</b>             | Yellow, plastic, +400 gauge minimum, conforming to UN mark 5h4                              | Yellow, rigid spill-proof containers with sealable lids                       | Yellow rigid puncture resistant containers                                     | Yellow rigid spill-proof with sealable lids | Yellow rigid puncture resistant sharps container                                       | Grey, rigid, spill-proof containers with sealable lids  |
| <b>FILLING &amp; CLOSURE</b> | Close and seal when 2/3 full  | Close and seal when 2/3 full  | Close and seal when 2/3 full   | Close and seal when 2/3 full                | Close and seal when 2/3 full   | Close and seal when 2/3 full  |
| <b>TYPICAL CONTENTS</b>      | Contaminated Petri-dishes, universals, plastic Pasteur pipettes                             | Plastic pipettes  | Sharps including: Needles, Syringes, slides, coverslips                        | Non-Sharp cytotoxic waste                   | Needles, syringes, & broken glassware contaminated with chemicals / cytotoxic material | Microfuge tubes with phenol / chloroform extracts or Mercaptoethanol*                         |
| <b>EXCLUDED ITEMS</b>        | Free liquids, sharp items, cytotoxic waste, chemicals / pharmaceuticals or metallic objects | Sharp items, cytotoxic waste, chemicals / pharmaceuticals or metallic objects | Cytotoxic waste, free liquids, chemicals / pharmaceuticals or metallic objects | Sharps                                      | Free liquids   | Sharps  |
| <b>DISPOSAL METHOD</b>       | Alternative Technology  | Alternative Technology  | Alternative Technology   | Incinerator                                 | Incinerator  | Incinerator except Mercaptoethanol* where special arrangements are made with waste contractor |

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## Appendix C

### WASTE MANAGEMENT (MOVEMENT OF HAZARDOUS WASTE) REGULATIONS, 1998

B 000000

**Form C.1.** Consignment Note for consignments of hazardous waste transported within the State  
(NOT to consignments for transshipment into or out of the State)

#### PART A (to be completed by the consignor)

1. Name and address of consignor<sup>1</sup>: **SCIENCE DEPT., INSTITUTE OF TECHNOLOGY TALLAGHT, OLD BLESSINGTON RD., DUBLIN 24 .Tel: 4042365 Fax: 4042364**
2. Name and chemical composition of waste\* **UN 3291 CLINICAL WASTE, UNSPECIFIED, N.O.S. 6.2 II, ADR**
3. European Waste Catalogue/ Hazardous Waste List Description(s) and Code(s)<sup>2</sup>: **180101, 180102, 180103, 180205, 180206 (180108)\***
4. Origin of waste (name and address of producer if different from 1.) **AS ABOVE**
5. Process(es) that waste originates from: **RESEARCH AND TEACHING ACTIVITY**
6. Quantity (indicate kg or litres): .....
7. Size, type<sup>3</sup> and number of containers: **# OF BINS X 400L WHEELED BINS**
8. Physical characteristics<sup>4</sup>: **SOLIDS AND LIQUIDS**
9. Components which are hazardous (giving concentrations in each case): **POSSIBLE RISK OF INFECTION PROTECTIVE CLOTHING**
10. Hazardous properties<sup>5</sup> and special handling instruction (if any): **MAY CONTAIN SHARPS AND BE INFECTIOUS – WEAR GLOVES AND PROTECTIVE CLOTHING**
11. Name and address of consignee<sup>6</sup>: **ECO-SAFE SYSTEMS LTD., UNIT 1A, ALLIED IND. ESTATE, KYLEMORE RD., DUBLIN 10.**
12. I, the consignor, certify that the information given in Part A above is complete and correct to the best of my knowledge.

Signed:.....

Date:.....

Name (block letters) ..... on behalf of **INSTITUTE OF TECHNOLOGY TALLAGHT**

Position held by person signing **LABORATORY TECHNICIAN**

#### PART B (to be completed by the carrier)

13. I, the carrier,<sup>7</sup> certify that I collected the waste described in Part A in vehicle (reg. no.) ..... at (time) ..... on (date) ..... and that I have been informed of the hazardous nature of the waste, as set out in that Part.

Signed ..... on behalf of

Name (Block letters)..... Signature of consignor as witness

#### PART B(TO BE COMPLETED BY THE CARRIER)

14. Name and address of consignee:

Tel.: ..... Fax: .....

15: Waste licence number (if applicable)<sup>8</sup> ..... Waste permit num(if applicable)<sup>9</sup>  
Certificate of registration (if applicable)<sup>10</sup> .....

16. The waste described in Part A was delivered to me by (carrier) .....  
..... in vehicle (reg.no.) .....

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at (time) ..... on (date) ..... on behalf of (consignor)  
.....

17. (a) The consignment was accepted: ..... (b) The consignment was rejected:  
.....
18. If the consignment of waste was rejected, state the reason(s):  
.....
19. If the consignment of waste was accepted, state the recovery /disposal activity(ies) to which it will be subject and provide code number and description of the technology involved<sup>11</sup>
20. I, the consignee, certify that the information given in Part C above is complete and correct to the best of my knowledge.

Signed:.....

Date.....

Name (block letters) ..... on behalf of TU Dublin

Position held by person signing .....

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\* full description may be attached on separate page

Footnotes <sup>1</sup> to <sup>11</sup> see relevant definitions and lists in the "Instructions for completion of Consignment notes for Hazardous Waste".

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**CARRIER'S COPY - to be given to the carrier of the waste, after completion of PART C by the consignee, and retained by the carrier**

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### Appendix D

| CONTAINER TYPE  | UN MARK | DESCRIPTION OF UNIT  |
|---|---------|--|
| Yellow bags (for disposal by autoclaving)                 | 5H4     | Plastic Film Bag   |
| Yellow rigid bins (for disposal by autoclaving)           | 1H2     | Plastic drum with removable head   |
|   | 3H2     | Plastic jerrican with removable lid  |
|   | 4H2     | Solid plastic box  |
| Yellow sharps bins (for disposal by autoclaving)          | 4H2Y    | Solid plastic box  |
| Yellow rigid bins (for disposal by incineration)          | 1H2     | Plastic drum with removable head   |
|   | 3H2     | Plastic jerrican with removable lid  |
|   | 4H2     | Solid plastic box  |
| Grey wheeled bin with yellow lid or red wheeled bin (IBC) | 11H2    | IBC, rigid plastic for solids, loaded or discharged by gravity, freestanding |



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|  |         |            |  |
|--|---------|------------|--|
| Ref. No.   | SOP 9.7 | Issue Date |  |
| Version  |         | Page No.   |  |
| <b>Section: Laboratory safety</b>                        |         |            |  |
| <b>Subject Title: Biological safety cabinet Class II</b> |         |            |  |
| Authorised by  |         |            |  |

## Safe use of Biological Safety Cabinet Category 2

Self-containment equipment and biological safety cabinets are used to prevent as much as possible the creation and circulation of aerosols. The creation of aerosols during centrifuging is often underestimated. For a proper functioning this equipment is to be properly maintained and periodically tested. Instructions for use and handling regulations of equipment are to be present in the workplace.

When working pathogenic micro-organisms a biological safety cabinet category 2 offers both product and personal protection. All aerosol producing activities are to be carried out in a biological safety cabinet. A biological safety cabinet category 2 gives a proper protection against releasing aerosols through a protective air curtain in the work opening and a proper protection of the experiment through a laminar down flow. The working rules are:

- Wear a tightly closed lab coat with cuffs or sleeve caps.
- Let the Cabinet run at least 30minutes before you start, so that the laminar air flow at all is set and only sterile air is blown in the Cabinet.
- Don't wear rings, watches and bracelets and wear gloves if necessary.
- Collect the materials required for the experiment in advance.
- Wipe the table top and air currents 10 minutes after switching on the biological safety cabinet using 70% alcohol.
- Bring the required materials into the work space of the biological safety cabinet after wiping this with 70% alcohol.
- Check the proper functioning of the biological safety cabinet. Disrupt the air current as little as possible when performing the activities (calm arm movements).
- Always keep the exhaust splits at the front and back of the work top free.
- Avoid the use of Bunsen burners.
- Avoid walking past the biological safety cabinet and open the laboratory doors as little as possible.
- Collect all disposable contaminated waste in a small box or bag in the safety cabinet for autoclaving.
- Disinfect the work surface of the cupboard after the work.
- After you have finished your activities keep the ventilator of the cabinet on for at least 30 minutes.
- Fill in the logbook of the biological safety cabinet.

### Particulars:

- If the cabinet's ventilation falls out (e.g. in case of a power interruption), close immediately any opened tubes etc. and close the work opening.

### Policy:

Biological safety cabinets are provided and are to be used whenever there is risk of infection by splatter or aerosolisation. All biological safety cabinets are inspected and certified annually.

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## **Purpose:**

The policy ensures staff can safely manipulate potentially infectious specimens.

## **Responsibility:**

Management and employees

## **Key Elements**

- Ensure all staff are familiar with safe work practices and procedures in compliance with established institution policies and procedures
- Establish and maintain a maintenance schedule for the biological safety cabinets

## **Procedure:**

### **Class II Biological Safety Cabinet**

This is a ventilated cabinet for personnel, product and environmental protection which provides inward airflow and HEPA-filtered supply and exhaust air. Class II cabinets are used for low to moderate risk biological agents.

#### **Operating Procedure for Biological Safety Cabinet**

##### **1. Preparation**

- Turn off UV lamp, turn on fluorescent
- Check air vents for obstructions, switch on blower
- Allow air to purge workspace 30minutes
- Ensure air pressure is within allowable limits and record

##### **2. Disinfection**

- Spray or swab all interior surfaces with appropriate disinfectant (70% IPA)
- Allow to air dry

##### **3. Assemble Material**

- Introduce only material required to perform procedure
- Place material such that clean and contaminated items do not meet
- Place contaminated material container at right rear
- Ensure view screen is properly located and secured

##### **4. Purge (pre-use)**

- Allow air purge period with no activity inside (leave blower on!)

##### **5. Personal Procedures**

- Wear protective clothing, gloves, mask, etc. as appropriate

##### **6. Perform Procedures**

- Introduce hands into work space, work carefully and methodically (i.e. from clean to work area to discard). Work at least 6" inside the front vent.
- DO NOT remove hands from work space until procedures are complete and all critical material is secured.
- Remove gloves into contaminated material container

##### **7. Purge (Post-use)**

- Allow air purge period with no activity inside (leave blower on!).

##### **8. Personal Procedures**

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- Remove protective clothing; mask, etc. dispose as appropriate.
- Wash hands.

### 9. Terminal Disinfection

- gloves, remove materials to incubator, etc., to biohazard bag, autoclave as appropriate.
- Spray or swab all interior surfaces with appropriate disinfectant (70% IPA)
- Leave on for 30 min after use.
- Monthly – clean gutter area with disinfectant and document.

### 10. Shutdown

- Turn off blower and fluorescent lamp.
- Turn on UV lamp.