**Centre for Science at Extreme Conditions (CSEC)**

**Erskine Williamson Building**

# SAFETY INFORMATION

**In an emergency dial 2222 (internal phone)**
**or 0131 651 3999**
(Operator will obtain **Emergency Services** as required)

| | Location |
|---|---|
| **First Aid Room** | **2301 JCMB** |
| **CSEC First Aiders**: Konstantin Kamenev<br>Steve Hankin<br>(See First Aid posters for First Aiders and assistance outwith CSEC) | **3.3802 CSEC**<br>**2.2809A CSEC** |
| **Emergency eye-wash stations in CSEC** | **2.2807, 2.2808**<br>**2.2809, 2.2810** |
| **Emergency showers in CSEC** | **2.2810 & Level 3** |

**If you have any questions about safety or the information provided in this booklet, please contact the CSEC Superintendent & Safety Adviser:**

Dr Steve Hankin
Rm 2.2809A
Erskine Williamson Building
Tel: 0131 650 5313
Email: steve.hankin@ed.ac.uk

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# Introduction

Welcome to CSEC.

Being safe and acting responsibly is fundamental to good science and this booklet is intended to give an overview of the hazards and the good practices in place to manage risks and maintain our high standards in CSEC and at the University.

The Director of CSEC is responsible for ensuring that the staff and students work under conditions such that risks are not taken. This means that the Director, staff and students must understand safety procedures and use them in the course of their work.

The Director of CSEC is supported in all matters of safety and security by the CSEC Superintendent & Safety Adviser.

CSEC is located in the Erskine Williamson Building which is connected to the James Clerk Maxwell Building (JCMB) on two levels. Care and consideration should be given to the safety of staff, students and visitors in and around CSEC and when accessing JCMB.

# Accidents (excluding Fire)

## In an emergency, contact University Security at Potterow

1. **telephone 2222 (internal) or 0131 651 3999 (mobile / payphone)**
2. give your name and telephone number
3. state the nature of the emergency and whether or not there are casualties
4. give the precise location of the emergency (Erskine Williamson Building, Room number)
5. wait for confirmation that your message has been understood

Stand by to render assistance unless by doing so you expose yourself to personal risk.

University Security will direct trained personnel to the site of the incident during normal working hours. At other times the emergency services will be alerted, if possible arrange for them to be met at the main entrance.

If help does not reach you in about ten minutes repeat the call.

## Reporting of Incidents

Details of any accident, incident or near-miss must be reported and recorded using the University's online Accident & Incident Reporting System (https://www.accidents.is.ed.ac.uk/). Even if there is no personal injury a hazardous situation or a **significant near miss** should be reported and drawn to the attention of the CSEC Superintendent & Safety Adviser, so that action can be taken to prevent reoccurrence. Reports can be made independently or with the assistance of the CSEC Superintendent & Safety Adviser. Details of all fires, however small, must also be reported directly to the University Health and Safety Office.

# Risk assessment

Carrying out a risk assessment is an important step in considering and describing how to carry out experimental work safely and effectively. A risk assessment must be carried out for all experimental work and approved **before** the work is started. Either a Risk Assessment form provided by your School or the *CSEC Risk & CoSHH Assessment* form should be used. For advice, contact the CSEC Superintendent & Safety Adviser. The approval for students and research staff is to be given by your supervisor, for all other staff this should be your line manager, and for visitors it is the 'lab responsible' member of staff. A copy of the completed risk assessment should be kept in the relevant laboratory (Red Folder) and signed by everyone carrying out the experimental work. A copy should also be provided to the CSEC Superintendent & Safety Adviser.

# Hazards

**Electrical**
Electrical hazards are the most wide-spread risk in CSEC. These arise from mains power supply, DC power and high voltage supplies and other pieces of equipment including computer monitors as well as capacitive power in many systems, for example laser or photo-multiplier power supplies. The severity of electrical shock is determined by current, with currents of greater than 50 mA being frequently fatal. The resistance of the human body is highly dependent on skin moisture and earth contact, and in the worst conditions a fatal electric current can result from as little as 40 V.

Mains powered equipment and all electrical supplies must be kept clear of water and moisture. Hands must be dried before contact with any mains powered equipment or mains cables. Any equipment with frayed or damaged electrical wiring must be isolated immediately, reported to the local technician, rectified and tested before being re-used.

**Portable Appliance Test (P.A.T.)**
Some mains powered electrical equipment in CSEC is subject to PAT electrical safety testing. All eligible equipment must have a test label giving the date tested and signature of the tester. These tests are usually carried out by the supervising technician, in line with the University testing policy.

If electrical equipment is found without an up to-date electrical test label please ask the technician if it requires testing.

No electrical equipment must allow access to live mains power, and the repair of such equipment that requires access to live mains must be undertaken under supervised conditions, for example in the Electronics Workshop in JCMB.

High voltage, such as in photo-multiplier, x-ray tubes and laser supplies can result in fatal electrical shocks under all conditions. All high voltage devices and cables must be clearly labelled and rules for handling high voltage strictly adhered to. In addition many DC high voltage systems contain large capacitive storage and represent a severe electrical risk even when isolated from the mains supply.

**Physical / Mechanical**
Physical or mechanical risks exist throughout CSEC, mainly in areas where heavy equipment is being used or moved. Care must be taken with the operation or movement of heavy equipment and the correct lifting equipment must be used. Risks should be identified in the Risk Assessment and the correct operating and safety procedures applying to each machine or procedure must be understood prior to use. A written Safe System of Work (or Standard Operating Procedure) should accompany the Risk Assessment.

Mechanical risks also exist from cables, badly placed furniture and faulty or broken equipment. All such instances must be brought to the attention of the lab responsible or the CSEC Superintendent & Safety Adviser.

**Chemicals**
All chemicals must be treated as potentially harmful. The law requires that the use of chemicals that may pose health risks need to be assessed and documented safety procedures (a Risk Assessment, CoSHH Assessment and Safe System of Work) must be provided. These must be consulted and understood before use of the chemical and all safety procedures adhered to. Any required safety equipment must be provided and used. Safety glasses and a lab coat must be worn at all times in the Chemistry Laboratory (2.2810) and when moving or handling chemicals in any other laboratory.

When new chemicals are introduced to CSEC, a CoSHH assessment **MUST** be undertaken, documented, and necessary safety procedures agreed with the Chemical/CoSHH Safety Officer (Andrew Huxley, Rm 2619 JCMB) before the chemicals are opened.

**Sharps**
All sharps such as syringe needles, blades and glass MUST be disposed of properly into a proper Sharps Container (usually yellow). Syringes and blades should not be re-sheathed before placing in the Sharps Container and the container should not be over-filled (the lid must be able to close properly prior to disposal). When full, Sharps Containers should be sealed and disposed of via Stores and a replacement container obtained.

If a needle stick injury occurs, immediately contact a First Aider and notify your supervisor and the CSEC Superintendent & Safety Officer.

**Pressurised Gases & Cryogenic Fluids**
Some gases present a chemical risk, and must be handled in accordance with the CoSHH Regulations. In addition, pressurised gas bottles are a severe mechanical hazard, both in view of their weight and high pressure contents. All gas bottles must be secured in use and transported using a cylinder trolley. Cylinders must not be left unaccompanied in trolleys. Cylinder must be secured upright, using a bench clamp and/or cylinder stand.

Extreme care must also be exercised when changing gas regulators. This must only be carried out by someone who has been trained in handling cylinders. Gas regulators must be replaced every five years with some, in the case of corrosive gasses, required

to be changed more frequently. New regulators are date stamped; if you find an out of date regulator, or one without a date stamp, it should not be used.

**Liquefied gases must be stored and dispensed from dewars in areas with oxygen depletion sensors.** Users must read, understand and sign the risk assessment forms before dispensing and working with any cryogenic fluids.

A significant risk of harm to skin and eyes from splash or contact with cryogenic fluids requires suitable protective clothing and eye protection to be worn at all times while preparing dewars and transferring cryogenic fluids. An asphyxiation risk exists with the liquefied gases used in CSEC (typically liquid $N_2$, He). Storing and dispensing from dewars must only be done in areas that have oxygen depletion or oxygen sensing alarms. Decanting must be carried out in a controlled manner and with lab doors open during transfer. Transferring cryogenic fluids from dewars to instruments must never be left unsupervised; there must always be at least one other person present throughout the transfer. Decanting cryogenic fluids should never be carried out by a lone worker. Cryogenic fluids should be transported in proper containers only and dewars must never be accompanied in lifts. If a dewar requires the use of the lift, users should take the stairs and meet the lift when it arrives at the required floor. Portable Oxygen monitors are available from the CSEC Superintendent & Safety Officer.

To avoid damage to the floor material some form of thermal insulation must be used under the vessel you are filling. Mats have been provided in the Chemistry and Magnetism Labs for this. Do not spill the liquid gas onto the unprotected floor.

**Radioactive Sources and X-Rays**

Radiation protection and risk evaluation is monitored by the Radiation Protection Supervisor (Tom Davinson, Rm 5405 JCMB) and X-Ray Safety Supervisor (John Loveday, Rm 2508 JCMB) and individual rules are set to ensure safe working in each case.

**All radiation/x-ray work must be agreed with the Radiation Protection / X-Ray Safety Supervisors before being undertaken and all local rules strictly adhered to.**

High voltage supplied to x-rays systems and nuclear detectors are a severe electrical risk and local rules of handling of high voltage must be adhered to.

Anyone working with x-ray or radioactive sources must attend the University of Edinburgh Radiation Protection course.

**Lasers**

All lasers represent a risk to eyes, and high powered lasers a risk on skin contact. In extreme cases they are a fire hazard. Laser safety is monitored by the Laser Safety Officer and individual rules are set to ensure safe working in each case. These rules must be strictly adhered to. A written Safe System of Work must be completed and approved by the CSEC Laser Safety Officer (Eugene Gregoryanz, Rm 3.3804) before any work is carried out.

Anyone working with lasers must attend the University of Edinburgh Laser Safety course.

High voltage supplies to all lasers are a severe electrical risk. They usually also contain large capacitive storage, so are a severe risk even when isolated from the electrical supply.

**High Pressure**
High pressure work can be associated with a risk of explosion and should only be carried out by competent, trained personnel, in laboratories designated for this type of work. A Risk Assessment and Safe System of Work must be completed and approved (by Konstantin Kamenev, Rm 3.3802) before any work is carried out. All necessary safety equipment must be used.

**High Temperature & Ovens**
When working with any equipment creating high temperatures it is essential that people and combustible materials are protected from any possible contact. Vessels must be suitable for use at the high temperatures and the risk assessment should consider and mitigate any hazards from volatiles released during heating. When using ovens protective gloves or tongs should be used to lift hot items. Anything hot should be placed onto heat resistant material and not directly onto the floor or bench.

When working with Radio Frequency generators no metal items, such as jewellery, should be worn in the laboratory.

**Biological**
All work involving biological hazards must be agreed with the CSEC Superintendent & Safety Officer in conjunction with the relevant School's biological safety officer, before being undertaken in CSEC and all local rules adhered to.

# Safe System of Work

A written Safe System of Work must be provided for every piece of equipment, this should include instructions on:

1. start-up
2. normal safe working procedures
3. normal shut down
4. emergency shut down

These must be kept with the equipment training log and registered users list in the laboratory's Red Folder. The contents of Red Folders are audited periodically for completeness and effectiveness.

# Laboratory Supervision

**Everyone working in and associated with CSEC must complete and return a CSEC Personnel Information form and Safety Declaration available on the CSEC website or from the CSEC Superintendent & Safety Officer.**

Many research laboratories contain significant potential hazards including high voltage, chemical agents, ionising and non-ionising radiation. Everyone conducting experimental work in a laboratory must be competent in carrying out the work or supervised by a competent person whilst being trained. All local rules must be obeyed regarding these hazards.

**Training Records**
Area and Machine Supervisors must ensure that all personnel using equipment in CSEC have been properly trained and are competent to use the equipment. A list of all authorised users must be provided and kept up to date and signed by the academic supervisor/ lab responsible who carried out the training.

All users of x-rays and lasers must attend the University of Edinburgh Radiation Protection and Laser Safety courses.

**Undergraduates**
If undergraduates are to be given access to Laboratories for project work they must complete the relevant University training course(s). A Training Record form must be completed by the supervisor for all activities.

All relevant risk assessments and CoSHH forms must be read and signed by the student. Any work/procedures carried out by undergraduates must be approved by the academic supervisor prior to the work commencing.

In the case of x-rays and lasers there must be no risk of exposure to direct unenclosed beams at any part of the experiment. Undergraduates must not be left unsupervised in laboratories or carry out any hazardous work or beam alignments.

**Working outside normal** hours (before 0800 and after 1800 Monday to Friday, and weekends) is particularly hazardous, and activities involving severe hazards, such as high voltage, must not be undertaken. **Lone working out of hours in laboratories is <u>not permitted</u>**. Remember there is no emergency safety team outside normal hours. All out of hours working must be risk assessed and approved by the academic supervisor and a copy held by the CSEC Superintendent & Safety Adviser.

**All personnel in the building outside normal working hours** must sign the access book at the main door and ensure they comply with University and CSEC rules on after hours and lone working.

Working in locked laboratories is not allowed unless they are fitted with emergency entry switches. In laboratories fitted with combination locks these must be in the unlocked position when the laboratory is occupied and locked by the last person leaving.

# Visitors (Rules for academics, students, schools and children)

Academics and visiting researchers are bound by the same safety rules as local staff. The staff inviting visitors must inform the CSEC Superintendent & Safety Adviser when the visitor arrives and to what equipment and facilities they require access. They must be issued with the safety leaflet and informed of any safety rules associated with their work. Visitors working in CSEC must complete any required University of Edinburgh safety courses.

School Parties: parties of school students visiting the University must be supervised at all times and not left free to wander round the building. The CSEC Superintendent & Safety Adviser must be informed prior to the party arriving.

School Students: individual school students making use of laboratories must be supervised at all times in the laboratory. They must also complete the relevant safety form.

Children: children are not normally allowed in University buildings. If for any reason a child has to be brought into the building they must be kept under supervision at all times.

# Safeguarding our Working Environment

CSEC is a **NO SMOKING** environment. Smoking is not permitted in any part of the building.

**Laboratories** must be kept tidy, free of loose cables, waste paper and carelessly located equipment that can block fire escapes or emergency access to the room. Samples must be labelled and stored appropriately. Samples no longer needed should be disposed of appropriately and not left abandoned in laboratory drawers / cupboards.

**Offices and general workspaces** must be kept tidy and free from loose cables, large amounts of waste paper, heavily overloaded shelves and other physical risks. Personally owned heaters and kettles are not permitted in offices.

**Computer users** should ensure they have a comfortable seating location to reduce the risk of posture and repetitive strain injury. The computer screen must be flicker-free and comfortably readable. Chairs should be adjustable for height and backrest position and should have a stable (5 spoke) base.

Regular computer users must carry out an assessment for their own visual display unit/work station. An online course on VDU use is available and should be completed by all staff who use VDUs on a regular basis:
(https://secure.cardinus.com/launch.asp?id=unive30748&admin=true)

Assessment forms and further information including DSE/VDU eye tests are available online (http://www.ed.ac.uk/schools-departments/health-safety/guidance/workplaces-general/personal-computing). If the assessment recognises that remedial action is required then please contact the CSEC Superintendent & Safety Adviser.

All **public access areas** within CSEC must be kept clear of rubbish, trip and slip hazards such as cables liquids or hazardous substances that are dropped. This applies to all corridors, stairwells, toilets, kitchen, seminar room, reading room and meeting rooms. Anything that is dropped on the floor must be cleaned up as soon as possible. Fire exits must be kept clear of obstructions at all times.

Before leaving a laboratory, disposable safety gloves should be removed and discarded, unless you are carrying hazardous substances, in which case a one glove policy is in place - gloved hand to carry the item (ideally secure in a closed container) and un-gloved to open doors etc.

**No PPE should be worn in any food or public meeting areas.**

No running, cycling or any other means of movement by mechanical device is permitted in the corridors and stairwells. Be aware of your surroundings to avoid accidents. Extra care should be taken when carrying a load. Use the lift whenever at least one hand isn't free to use the stair handrail.

On completion of your studies or time working in CSEC, you should remove all items belonging to you and leave your desk and laboratory workspaces in a clean and tidy condition. Inform your supervisor of any items (e.g. samples, papers, data, lab books etc) being left behind for reference or future use.

**FURTHER INFORMATION: Area Safety Supervisors**

| | | Telephone | Room |
|---|---|---|---|
| **General safety procedures** | **S. Hankin** | **50-5313** | **2.2809A** |
| **Laser** | **E. Gregoryanz** | **50-5956** | **3.3804** |
| **Radiation Protection** | **T. Davinson** | **50-5250/5282** | **5405 JCMB** |
| **X-Ray** | **J. Loveday** | **51-7233** | **3.3801** |
| **Electrical Testing** | **S. Hankin** | **50-5313** | **2.2809A** |
| **Chemical/CoSSH** | **A. Huxley** | **51-7053** | **2619 JCMB** |
| **High Pressure/ Magnetic** | **K. Kamenev** | **51-7232** | **3.3802** |
| **Radio Frequency** | **A. Huxley** | **51-7053** | **2619 JCMB** |
| **Biological** | **A. Dawson** | **50-7165** | **2617 JCMB** |

www.csec.ed.ac.uk

Further information and all relevant safety forms can be downloaded from the Edinburgh University Safety Department website:

https://www.ed.ac.uk/health-safety

# Notes