

James Watt School of Engineering
University of Glasgow

Electronics Design Centre

Level 2 Measurement Lab (222A)

Rankine Building

CODE OF PRACTICE

The adoption and practice of good safety procedures is of paramount importance both for the health of fellow workers and for the integrity of the fabric of the laboratories in the Electronic Design Centre.

1. Lab Safety Management Responsibilities

- 1) **Everyone** has a role in protecting the health and safety of both other lab users and themselves, and thus should be familiar with the **School's Safety Manual**.

Academic Supervisors take full responsibility for the health and safety of their own group's research activities, and consequently must ensure their staff and students are familiar with both the content of this **Code of Practice** and the **School's Safety Manual** and apply its requirements.

- 2) No work may be carried out in the Electronic Design Centre area of the Rankine Building without the prior permission of Professor David Cumming (**Lab Responsible Person**). The role of the Lab Responsible Person for the EDC is specified in **Appendix A**, in accordance with the **School's Safety Manual**.
- 3) No work shall be carried out until a **Risk Assessment** has been conducted by the research staff/students, **approved by their Supervisor** and the **Director of Safety**, and acknowledged by the **Lab Responsible Person**.
- 4) An **electronic copy** of the approved Risk Assessment shall be sent to the Lab Responsible Person to be kept as record (note that this can be done using the online risk assessment system). A hard copy of the approved risk assessment shall be displayed next to the relevant research rig and equipment for inspection. The procedures of the preparation of Risk Assessment are summarised in **Appendix B**.
- 5) New staff and students should also make themselves aware of the **general safety procedures** highlighted in the School's Safety Manual and of the locations of safety equipment in the various labs.

These are:

In case of emergency, dial telephone number: **4444 (internal), 0141 330 4444 (external)**

Emergency exits are located at either end of the main corridor

The fire Extinguishers are located in the main corridors in level 2

First Aid kits are just inside the door of 216 and 222a

Eye baths are located in room 216 (the fume cupboard room)

Safety goggles are located in room 215

- 6) All new staff and research students will fill in the safety documentation which can be found on the James Watt Nanofabrication Centre website before being trained in cleanroom techniques. <http://www.jwnc.gla.ac.uk>
- 7) Any work outwith '9am to 5pm' (including weekend working) requires permission of your supervisors (Professor David Cumming). This can be given by an e-mail trail for audit purposes in the event of an accident and can be for multiple or extended periods of time. If permitted, the out-of-hours working book located in the foyer of the Rankine building must be signed and the time recorded on arrival and the time of departure. Potentially dangerous operations **must never** be undertaken out-with normal hours **unless a second responsible person is present**. (Please read the safety regulations in the School's Safety Manual for more details.). Working alone is not recommended if doing any of the following procedures; (i) chemical manipulations of any kind; (ii) using high voltage power supplies. If you are working in a dark room be aware that others may not know of your presence. No one is to work alone when using hazardous materials or processes.

2. Practice of General Activities

- 1) The experimental area must be **kept tidy and clean**. This is **NOT** the responsibility of the cleaners. Good housekeeping must be maintained by the lab users
- 2) Food and drink are not permitted in the lab.
- 3) The **walkways** and **marked out** sections of the floor leading to the fire exit must remain clear. Under no circumstances should lab equipment be stored in the route from your place of work to the fire exit route. If things are possibly impeding your exit then you should either move them, contact the person who placed them there, or inform both the Lab Responsible person and your supervisor.
- 4) Access to switch boxes and valves must remain clear and must not be blocked by equipment.
- 5) Dedicated storage cupboards and areas must be used. Windowsills should not be used as storage areas.
- 6) **Laboratory doors should remain shut** at all times to ensure security and fire safety. This includes the rolling door at the end of the lab.
- 7) Equipment must be placed in appropriate locations to safe-guard its integrity, minimise potential damage and to allow other researchers access to it.
- 8) Once experimental work has been completed and the experimental setup is no longer required, the **experimental area must be cleared** in preparation for other experiments and researchers.
- 9) If it is necessary to remove equipment from the lab, permission must be given by your supervisor and the Lab Responsible person. If necessary, seek assistance with moving heavy items.

- 10) If equipment breaks down or is not working, report the fault to your supervisor and the responsible person immediately.
- 11) A fault with the fabric of the room, such as a lighting failure, should be reported through the Maintenance Request portal found on the Estates and Commercial Services webpage, <http://www.gla.ac.uk/services/estates/>.
- 12) Personal belongings such as bags and coats should be stored in owner's office or under a bench, not left on the open floor. Books and paper in the labs should be kept to a minimum.
- 13) Soldering Irons must not be left on when not in use.

3. Practice of Biological or Chemical activities

- 1) Lab coats or other protective clothing, as required, must be worn at all times in the lab when handling chemicals or biological materials of any kind. Where necessary, safety spectacles must also be worn. Safety glasses should be worn when using soldering equipment, cutting tools, or any tools that may cause injury to the eye.
- 2) If anyone wishes to use new or additional procedures (biological or chemical) they **MUST** inform their supervisor of this **BEFORE** ordering any chemicals, biochemicals, cell lines etc., or starting the practical work. A COSHH Form or risk assessment must be completed using the School web based database and approved by their supervisor and Dr Andrew Glidle. Also, people should e-mail others in the group if performing a new and particularly hazardous procedure.
- 3) Any work with solvents, corrosive chemicals, concentrated and moderate strength acids and alkalis must be carried out in the fume cupboard in Rm 216 with safety glasses and disposable gloves worn. Used gloves and paper towels must be put into the bin bag.
- 4) Waste solvents must be disposed of in Rm 216 into the waste bottles located in the fume cupboard. Acetone, Methanol and Iso-Propyl Alcohol poured into the UNCHLORINATED waste. Chlorobenzene poured into the CHLORINATED waste. NEVER add acid or alkalis to these bottles.
- 5) Organic solvents must never be heated on the hotplate.
- 6) Acid should be disposed of in the fume cupboard as follows:

Fill the sink with water then slowly add the acid to the water to dilute, and then allow the dilute acid to drain away.
- 7) In the event of an acid or alkali spillage on anyone immediately soak the affected area with water using the shower attached to the fume cupboard.

In the event of an accident or mishap tell someone, preferably one of the lab. staff, supervisor or colleague.

If you find yourself following a possibly unfamiliar procedure or performing an experiment and are unsure of what to do next or if something is going wrong, seek assistance from somebody rather than end up having an accident.
- 8) ALL containers, beakers, bottles etc. must be correctly labelled with owner's name, date and contents. Unlabelled containers or those not properly labelled will be thrown away.

- 9) ALL used glassware must be cleaned and tidied after use.
- 10) All non-contaminated broken glassware, slides and coverslips must be disposed of in the waste glass box. All sharps i.e. scalpel blades, hypodermic needles and blades should be disposed of in the small sharps box. Waste syringes (non-contaminated) should be put in the bin.

Biological Culture Labs

- 11) All cell culture work must be carried out in the laminar flow cabinet in Room 216.
- 12) All waste products from cell culture work i.e. plastic petri dishes, pipettes and glassware must be placed in the Biological Waste containers which are uplifted by Industrial Waste Contractors.
- 13) Any spillage of cell or bacterial culture must be treated with bleach, mopped up with paper towel and treated with alcohol. Wastepaper must be put into the Biological Hazardous Waste containers.
- 14) NEVER mouth pipette, use the pi-pumps provided.
- 15) Only essential material should be stored in the fridges as space is limited.
- 16) Anyone working with microorganisms must follow the guidelines set out in COSHH form. Only those working with these materials are allowed in the room during such work. Disposal of virus, microorganisms (e.g. bacteria and cell cultures) and associated waste products should be soaked in Virkon in the Level 8 Biomedical Engineering laboratories.

Final points for all labs.

Anyone storing material in fridge/freezers should try to keep this to a minimum; there is limited scope for long term storage.

To minimise dust etc. on benches bench tops will be cleaned monthly it is your responsibility to clear the bench beforehand. Keeping a minimum amount of paper in the lab reduces dust

Additional safety information covering the use of the Chemistry and various categories of Biological and Laser rooms is given in other documents either on the Safety Website or e-mailed to you by Andrew Glidle or your supervisor.

4. Covid-19 measures

- 1) Guidance from the HSE, UK Government and Scottish Government to manage the risk related to Covid-19 pandemic must be applied to the EDC Labs. These include physical distancing, frequent hand washing and hygiene measures, cough etiquettes and face covering in enclosed public space. Considerations for codes of practice and risk assessment for the James Watt School of Engineering can be found on the on the School Safety pages: <https://www.gla.ac.uk/schools/engineering/informationforstaff/safety/> for general details of working practices and risks that must be observed during the Covid-19 pandemic.

- 2) Physical distancing within Room 222A means a maximum capacity of:
 - i. 2 people working at a time.
- 3) Demand to use the lab will be managed by the Lab Guardian in collaboration with the Safety Coordinator. Collaboration will be required between lab users, supervisors, PIs and the lab guardian to establish a rota where necessary. Impact on the overall capacity of the Rankine building will be reviewed by the Technical Services Manager.
- 4) Lab users must wash their hands regularly and wipe workstation surfaces, materials, and equipment at the start of their work and before leaving.
- 5) Emergency support (First Aiders and Fire Area Officer) might be constrained due to Covid-19 restriction on building capacity. Task risk assessments need to be reviewed to include the above measures and to review with personnel through the risk assessment, which work can be safely undertaken with reduced access to emergency support. A Covid-19 risk assessment template can be found here (<https://www.gla.ac.uk/myglasgow/seps/az/sepscovid-19resourcecentre/>)

5. Practice of Hazardous Activities

- 1) **Electrical connections** between different devices or equipment should be safe. If in doubt, speak with technicians in the Electrical Workshop (Rankine level 7).
- 2) To minimise **trip hazards**, extension cables should be plugged into the closest socket and avoid crossing pathways. If crossing a pathway is totally unavoidable then, only as a temporary measure, the cable must be secured to the floor and covered with a suitable (commercially supplied) floor cable cover, cable protector, floor cable tidy to prevent tripping hazards. However, leads crossing pathways at the top or bottom of stairways is not allowed, even as a temporary measure – they should be routed at least 2 m (i.e. two paces) away from these areas.
 - i. Once equipment is not in use, it must be turned off and any extension cables used should be tidied to a suitable location.
 - ii. Leads and plugs should ONLY be used on the allocated item of equipment and should NOT be switched between equipment
 - iii. All equipment plugged into university outlets must be PAT tested (contact the electrical workshop for testing).
- 3) To minimise the risk of **falling objects**, no equipment or lab materials should be kept on top of cupboards and file cabinets, particularly those next to the edge of the upper floor.
- 4) Fire hazards:
 - i. All **flammable materials** (gases, liquid and solids) should be stored and handled in accordance to the School's Safety Manual and relevant SEPS guidelines.
 - ii. All equipment or experimental rigs using flammable materials should be certified and have adequate measures for preventing fire hazards.
 - iii. All users of flammable gases should be trained.
- 5) Explosion hazards when using compressed gases:
 - i. All gas cylinders should be secured to prevent falling.
 - ii. All pressure vessels should be certified by a professional manufacturer.

- iii. All pressure vessels should have measures to preventing over-charging, such as relief valves.
- iv. You should seek support from technicians when moving gas cylinders.
- v. All users of compressed gases should be trained.

Appendix A Duties of the EDC Lab Responsible (Lab 222A)

According to the School's Safety Manual, the **Lab Responsible is responsible for implementing safety policies in EDC Lab on a day-day basis.**

1. Considering the particularity of EDC Lab, the specific duties of its Lab Responsible is listed as below:
 - 1) to maintain the Code of Practice (CoP);
 - 2) to ensure the lab users keep their area in tidy and clean condition;
 - 3) to ensure each activity (experimental rig/equipment) has a Risk Assessment before work commences;
 - 4) to coordinate actions according to the School's Director of Safety's report / instructions following inspections;

Appendix B: Procedures of the preparation of the Risk Assessment

1. PDRAs and PG/UG students are responsible for formulating Risk Assessments on a day-day basis. For potentially hazardous activities, in addition to assessing the risks, the risk assessment form should include a standard operating procedure/method statement (and/or instrument manual) as an appended document.
2. Whilst the preference is for the persons undertaking the practical work to make their own risk assessments, it is permissible to use the on-line multi-user risk assessment forms for activities that will be undertaken by groups of people. However, in this case, each person involved in the practical work must sign the multi-user form online and a strict regime of user training should be in place that encompasses both the risks associated with the work as well as the practicalities of undertaking it.
3. Academic supervisors should assist the PDRAs and PG/UG students in preparing the risk assessment (this would typically be the case for less experienced PDRAs and PG/UG students). They should **ensure** foreseeable risks have been identified and adequate mitigation measures have been provided to reduce them as far as possible.
4. The academic supervisors should then approve the risk assessment form online (or ask for further information to be added); the Lab Responsible should also acknowledge (on-line) that the risk assessment has been completed, to indicate that as far as they can see, this activity does not conflict (in safety terms) with other activities in the lab. The Lab Responsible can also ask for further clarifications/additions concerning the procedures involved to be made, if necessary.
5. After the risk assessment has been approved/acknowledged by the supervisor and Lab Responsible/Lab Guardian, the School's Director of Safety approves, seeks

further clarifications, or (exceptionally) rejects the risk assessment if there are clearly hazards that cannot be sufficiently mitigated.

6. An e-copy of the **approved** Risk Assessment should be sent to the Lab Responsible by the PDRA or PG/UG student that originated the assessment (n.b. pdf's of the online form can be made by using the Print to PDF option available in most browsers)
7. A hard copy of the approved Risk Assessment and standard operating procedure should be kept or displayed next to the relevant experimental rig or equipment.
8. The Lab Responsible approves the start of activity after receiving the **approved** Risk Assessment.
9. If there is any substantial change to the people or research activity as stated in the Risk Assessment, it **MUST** be revised accordingly, and pass procedures 1-7 as above.