

SCHOOL OF ENGINEERING

Petroleum Engineering

LOCAL LABORATORY RULES

To be read in conjunction with the School's safety handbooks, policies and guidance: [School Policies, Guidance & Resources | School of Engineering | The University of Aberdeen \(abdn.ac.uk\)](#)

NO EATING OR DRINKING PERMITTED IN THE LAB

| | | |
|-----------------------------|--|------|
| Laboratory Coordinator | Dr Hossein Hamidi hossein.hamidi@abdn.ac.uk | 3960 |
| Technicians | Mr Jonathan Boschen-Rose jonathan.boschen-rose@abdn.ac.uk | 4543 |
| | Mr Yaroslav Kruchek yaroslav.kruchek@abdn.ac.uk | 2790 |
| | Dr Ifeyinwa Orakwe ifeyinwa.orakwe@abdn.ac.uk | 2792 |
| Local Safety Coordinator | Mr G. Cordiner g.cordiner@abdn.ac.uk | 2788 |
| Technical Resources Officer | Mr G. Cordiner g.cordiner@abdn.ac.uk | 2788 |

Contents

| | |
|--|---|
| Areas covered by this document | 1 |
| 1. INTRODUCTION..... | 2 |
| 2. TRAINING & RISK ASSESSMENT | 2 |
| 3. PERSONAL AND PROTECTIVE EQUIPMENT | 2 |
| 4. CHEMICALS | 3 |
| 5. ELECTRICITY | 4 |
| 6. COMPRESSED AIR..... | 4 |
| 7. GAS CYLINDERS | 4 |
| 8. EQUIPMENT..... | 4 |
| 8.1 Notes | 5 |
| 9. HAND TOOLS..... | 6 |
| 10. ULTRASONIC HOMOGENIZER | 6 |
| 11. LONE WORKING | 6 |
| 11.1 Undergraduate students and taught postgraduate students | 6 |
| 11.2 PhD students and PDRAs..... | 7 |
| 12. SLIPS AND TRIPS | 7 |
| 13. OBSERVATION CARDS | 7 |
| 14. ACCIDENT / NEAR MISS REPORTING (See folder in lab.)..... | 7 |
| 15. LEGIONELLA CONTROL..... | 7 |
| 15.1 Legionella Prevention | 8 |
| 16. GENERAL | 8 |
| Review Record..... | 9 |

| Areas covered by this document | |
|------------------------------------|--------------------------|
| Petroleum Engineering Laboratories | FN012, FN012.1, FN038.1. |
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1. INTRODUCTION

These local safety rules are basic guidelines that should be followed in order to work in a safe and responsible manner within the laboratories located throughout the School of Engineering. They are not exhaustive and further safety measures may need to be taken dependant on individual projects.

The information contained in this document follows IchemE Safety Centre Guidance on Laboratory Process Safety Management Systems [sample-university-laboratory-process-safety-management-system.pdf \(icheme.org\)](https://www.icheme.org/publications/sample-university-laboratory-process-safety-management-system.pdf) .

2. TRAINING & RISK ASSESSMENT

- All persons commencing work in the lab must undergo a formal Laboratory Induction in addition to the Basic Induction they received on arrival at the School.
- Records of induction and any further training records must be stored in the laboratory for inspection.
- Both taught and research students should be introduced to the Technician(s) by their Supervisor before lab induction. The Supervisor must make the Technician(s) aware of the details of the project.
- The School Safety Handbook should be read and understood prior to working in the lab.
- No work shall commence in the lab until a risk assessment has been completed in conformance with school procedures as stated in the School Safety Handbook.
- Risk assessment is the process of identifying where there is a significant risk (i.e. danger) in an activity and determining how that risk can be reduced or removed.
- Activity Risk Assessment and COSHH Risk Assessment forms must be completed by the student, signed by the Supervisor, and passed to a Technician before induction. A hard and electronic copy of each must be provided. A template with guidance notes can be found at [Health & Safety | School of Engineering | The University of Aberdeen \(abdn.ac.uk\)](https://www.abdn.ac.uk/health-safety/school-engineering).
- Before access to a lab is given, your completed lab induction, risk assessment and COSHH forms must be emailed to the Local Safety Coordinator copied to supervisor copied to ask for lab access.
- Your supervisor will reply to your e-mail, and if the supervisor agrees with the request they will add the access times to be given (see below) and the start and end dates for your lab access only then Grant can add you onto the swipe system.
- At present the times available for access for all students are 08.30 – 16.30 Mon–Fri (normal hours). The lab hours can be extended to 18.00 by request.
- Training for equipment use must be carried out by the Supervisor or a Technician. This must be carried out before the student is permitted to work in the lab. Work can only be carried out once the student has been deemed competent by the trainer.

3. PERSONAL AND PROTECTIVE EQUIPMENT

- Laboratory coats must be worn at all times and be fastened up BEFORE entering the laboratory working area. Please note that lab coats and glasses should be on before crossing the yellow safety line, e.g. not stored in a cupboard at the end of the lab, therefore walking through unprotected to retrieve PPE.

- Secure all long hair or loose clothing while in the lab.
- Sensible footwear and clothing must be worn. No sandals and no shorts/skirts revealing bare legs.
- Safety glasses should be worn at ALL TIMES when in the laboratory. This applies whether you are undertaking work or not.
- Respiration protection should be worn where necessary (refer to COSHH/risk assessment).
- Gloves are essential in laboratories and should be worn whenever there is a likelihood of the hand coming into contact with substances deemed hazardous (refer to COSHH) OR whenever you come into contact with any equipment, glassware, samples, or worktops which are likely to be contaminated with chemicals.
- Gloves should be changed regularly and not worn for unnecessary lengths of time. This avoids the cross contamination of chemicals on your gloves throughout the lab and helps prevent dermatitis.
- Gloves and lab coats **MUST** be removed when leaving the lab, unless you are transporting samples/equipment to a different lab (this should be avoided where possible).
- If you plan to use nanomaterials in your tests, please refer to “working safely with nanomaterials in research and development” document (Appendix A) and read it carefully.

4. CHEMICALS

- If you plan to use nanomaterials in your tests, please refer to [Microsoft Word - UKNSG Guidance - Working Safely with Nanomaterials in R&D - 2nd Edition.docx \(safenano.org\)](#) and read it carefully.
- All chemicals and compounds should be given to a Technician along with a Safety Data Sheet (SDS). **No Chemicals will be permitted in the lab without a SDS.** Each bottle/jar will be clearly marked with the PI name and date when received.
- Chemicals used in both maintenance and experimental work present a significant hazard and steps to manage this must be addressed in the Risk Assessment. Anyone working with chemicals must ensure, before any work commences, that they:
 - Understand the hazards associated with the chemicals.
 - Know what precautions should be taken.
 - Know the proper procedure for disposal of chemicals.
- The main hazards of chemicals are:
 - the toxic effects of chemicals if they enter the body.
 - the corrosive effects of some chemicals if they come into contact with human tissue.
 - the flammable nature of some chemicals.
 - the reactive nature of some chemicals - often when incompatible chemicals come together.
- Consider also what will be done if there is a spillage or uncontrolled release of a chemical. (Spill procedures should be outlined in the COSHH form).
- Solvents, acids, and poisons are stored separately, and a list of incompatible chemicals is kept in the SAFETY FOLDER in the Lab. **(This list is not all inclusive, the absence of a chemical from this list should not be taken to indicate that it is safe to mix it with any other chemical.)**

- Organic solvents must NOT be disposed of down the drains. If SDS states that a chemical cannot be disposed of down the drain, it must be disposed in a dedicated waste bottle (available in the lab) and clearly labelled with its contents.
- You must have a hardcopy of, and have read and understood, the SDS of every chemical that is stored or used in the lab before you commence work. SDS sheets of chemicals in the laboratory are available in the folder contained within the laboratory.

5. ELECTRICITY

- The Estates Section is responsible for the provision and maintenance of a safe electrical supply.
- When undertaking maintenance work on electrically powered equipment, the power supply should either be isolated and padlocked off, or, in the case of 13 Amp plugs, plugs should be removed from their sockets and the plug and cable returned to the equipment.
- No electrical equipment should be opened without permission of a Supervisor and without having the necessary experience.
- If the student means to undertake the building/alteration of any electrical equipment, it **MUST** be inspected by an electronics technician before use.
- Before use, every piece of electrical equipment should be inspected for an in date (2 years) PAT sticker. If it is missing or out of date, please request support from a technician.

6. COMPRESSED AIR

- Some machines and equipment require a compressed air supply for normal operation.
- The resident Technician(s) will make any connections to machines requiring compressed air and provide appropriate training where necessary.
- **Never direct compressed air at anyone.** Misuse of compressed air can cause serious injury or death.

7. GAS CYLINDERS

- Some machines and equipment require gas cylinder connections for normal operation.
- The resident Technician(s) will make any connections to machines requiring gas cylinders and provide appropriate training where necessary.
- Always open valves slowly. Do not use excessive force on valves and gauges. If a cylinder valve cannot be opened readily, it should be returned to the supplier.
- After use, always shut off the gas at the cylinder valve and release the pressure in the gauges before finally shutting all valves.
- Understand the hazardous properties of the compressed gases you are using (e.g. flammability and toxicity).

8. EQUIPMENT

| No. | Equipment | Location |
|-----|-----------------------------------|----------|
| 1 | OFITE Model 141-00-C Filter Press | FN012 |
| 2 | OFITE HPHT Filter Press | FN012 |
| 3 | OFITE Ageing Chambers | FN012 |
| 4 | OFITE Model 800 Rheometer | FN012 |

| | | |
|----|---|---------|
| 5 | OFITE Model 900 Rheometer | FN012 |
| 6 | BAROID Model 280 Rheometer | FN012 |
| 7 | OFITE / BAROID Marsh Funnels | FN012 |
| 8 | OFITE Sand Content Kits | FN012 |
| 9 | HAMILTON Beach Mixers | FN012 |
| 10 | PSL RHEOTEK Viscometer Tubes, Bath and Chiller Unit | FN012 |
| 11 | EUTECH 5+ Handheld pH Meter Kits | FN012 |
| 12 | ISOTECH LCR 819 (Liquid Capacitance Meter) | FN012 |
| 13 | FANN / OFITE Mud Balances | FN012 |
| 14 | OFITE Emulsion Stability Meters | FN012 |
| 15 | CORE LABS Instruments for Gas Porosity (PORG 200), Liquid Permeability (PERL 200) and Gas Permeability (PERG 200) | FN012 |
| 16 | BALANCES, PIPETTES, GLASSWARE, STIRRERS, HEATERS, | FN012 |
| 17 | ULTRASONIC BATH, VACUUM DESSICATOR | FN012 |
| 18 | ULTRASONIC HOMOGENIZER | FN012 |
| | | |
| 19 | Incubator | FN038.1 |
| 20 | Spectrophotometer | FN038.1 |
| 21 | FISHER Weighing Balance (analytical max. 500g) | FN038.1 |
| 22 | Tensiometer | FN038.1 |
| 23 | BINDER Oven | FN038.1 |
| 24 | ANTON PARR Digital Viscometer | FN038.1 |
| 25 | FISHER Oven | FN038.1 |
| 26 | Weighing balance (general max. 2kg) | FN038.1 |
| 27 | pH meter | FN038.1 |
| 28 | Conductivity Meter | FN038.1 |

8.1 Notes

- Training will be given when necessary.
- The equipment found in the laboratories is sensitive and should not be moved to other labs without lab coordinator/ technician permission.
- Communal equipment should be booked in advance to allow for fair usage.
- The maximum period of time a piece of equipment may be booked for is one week. This may be extended if there is no requirement from other students.
- To request a lab kit, an eform will have to be completed by individuals (academic and postgraduate research (PGR) students) who intend to borrow any of the lab kits prior to accessing it. This eform has been linked to a real-time spreadsheet that will allow everyone to see who is currently in possession of any of the lab kits and when it is due to be returned. Here is a five-step guide to the process:
 1. All staff and PGR students will have access to the eform links:
 - a. [Petroleum lab kit request form](#)
 - b. [Petroleum lab kit spreadsheet information](#)
 2. Lab technician will send the eform to the 'borrower' upon request.
 3. The 'borrower' completes the eform and informs the technician.
 4. The technician releases the kit to the 'borrower'.
 5. Items will be signed in by the technician when the 'borrower' returns the kit.

- Please, note that this procedure is not related to specific taught courses (e.g., EG552C, EG502E, reservoir engineering or drilling) where all items required will be made available by default and kits set-up prior to lab sessions.

9. HAND TOOLS

- Hand tools must be maintained in good condition. Safety goggles, safety footwear and gloves must be used when necessary.

10. ULTRASONIC HOMOGENIZER

Access to this device is strictly controlled. No one is permitted to use it without the written approval of the PI, Dr Hossein Hamidi, together with a detailed risk assessment signed by the PI.

- Some machines and equipment generate high frequency and/or high-volume noises that can damage hearing. In areas where these instruments are used everyone must wear appropriate PPE (ear protectors) and add it as a potential risk even if the instrument is not part of their specific experiment.
- Signs and other warnings should be in place on the instrument and the door on any lab where such an instrument might be used.
- For the Ultrasonic Homogenizer further safety measures must be observed. These include:
 - **Always** use the homogenizer in the sound proof chamber with the door firmly closed.
 - Maintain as much distance from the device as possible while it is in operation.

The device is password protected so it may only be operated by a trained user.

11. LONE WORKING

- Access to laboratory space is also subject to the various School rules and reference must be made to the School Safety Handbook:
https://www.abdn.ac.uk/engineering/documents/ENG_HS_Handbook.pdf
- School guidelines prohibit lone working or work outside normal hours. Where access to the lab and use of the any of the test facilities in the lab is necessary out with normal hours, approval must first be sought from the laboratory co-ordinator and school safety adviser.

11.1 Undergraduate students and taught postgraduate students

- Access to FN012 teaching lab for undergraduate students is limited to 08.30 - 16.30 Monday to Friday (direct swipe card access can be given).
- Access to FN012.1 and FN038.1 research labs for undergraduate students must be 'supervised' and limited to 08.30 - 16.30 Monday to Friday.
- MSc project students' access is limited in all laboratories to 08.30 - 16.30 Monday to Friday only.
- Working outside normal hours is strictly forbidden.

11.2 PGR students and research staff

- Access times to all laboratories will be assessed and approved on an individual basis by academic Supervisor and a Technician (where appropriate).

Note: Any research student who gives unauthorised users access to any lab is at risk of being banned from working.

12. SLIPS AND TRIPS

- The main walkways should be kept clear of objects and there should be no trailing cables. If it is absolutely necessary to have trailing cables, they should be covered with a suitable ramp or rubber cable protector.
- Any spills should be cleared immediately and properly. (contact spill team if necessary).

13. OBSERVATION CARDS

- Observation Cards can be found in wall holders along the ground floor corridors. They are to be used by everyone, staff, students and visitors. They are used to identify and record potential hazards or diversions from correct practices. The cards make staff aware of training or facilities that need improvement. Please use these cards to record observations of good safety behaviour, observations of unsafe behaviour or safety suggestions. **If you see a potential hazard you must take action to resolve it.** Get assistance from staff if required. Once a potential hazard has been mitigated you can then record it on an Observation Card.
- **Observation Cards SHOULD NOT be used to record an accident or near miss.**
- Further information and guidelines can be found at [Health & Safety | School of Engineering | The University of Aberdeen \(abdn.ac.uk\)](http://Health & Safety | School of Engineering | The University of Aberdeen (abdn.ac.uk)).

14. ACCIDENT / NEAR MISS REPORTING (See folder in lab.)

- Any accident or near miss must be reported as soon as possible following the incident - see [Health and Safety | StaffNet | The University of Aberdeen \(abdn.ac.uk\)](http://Health and Safety | StaffNet | The University of Aberdeen (abdn.ac.uk)). The accident or near miss report should be completed and submitted by a responsible person. This may be the Supervisor or Manager of the injured person, the person responsible for the area where the incident occurred, or the first aider involved in attending to the incident. The form may also be completed by the person involved in the incident.

The following **MUST** be reported:

- Any incident in which anyone is hurt (regardless of how minor the injury might appear at the time and regardless of whether they need medical treatment).
- Any incident in which someone could have been hurt (but in which perhaps chance or “good luck” prevented injury). These incidents are referred to as near misses.

15. LEGIONELLA CONTROL

- Legionnaires’ disease [legionellosis] is a form of pneumonia, which is caused by inhaling airborne water droplets [aerosols] that are contaminated with bacteria of the Legionella species. There is no evidence to show that the disease can be contracted from someone who is already infected.
- Legionellosis principally affects those who are vulnerable due to age, illness, immunosuppression, smoking etc. and can be fatal. Legionellae can also cause less serious

illnesses which are not fatal or permanently debilitating but which can affect any person. Legionella is commonly found in water systems. However, the conditions necessary for the growth and proliferation of the organism must try to be avoided. These include:

- Dirty water systems – the presence of sludge, scale, rust, algae and organic matter.
- Water temperatures in the range 20 to 45°C – Legionella multiplies within this range. It is killed rapidly at water temperatures above 60°C. Below 20°C it stays dormant but will grow if the temperature is raised and other conditions are favourable.

15.1 Legionella Prevention

- Aquasan tablets/liquid (or equivalent) [Aquasan Liquid Sanitiser – Guest Medical \(quest-medical.co.uk\)](http://www.guest-medical.co.uk), are used in the prevention of bacterial growth and slime in laboratory water baths, are placed in the tanks that are being used at temperatures in the range 20 to 45°C and the water is drained regularly to prevent corrosion of the tank and any instruments used within it.
- Emergency showers and eye baths are flushed regularly by Estates.

16. GENERAL

- Lab users should not be logging on to PCs unless they are allocated to use that computer. PCs found in the labs are there to run instruments and therefore should not be used by those who are not making use of the instrument. Any accidental changes or updates to the computers could have detrimental effects to the instruments attached. In addition to this, if the PC is located in another lab user's work area, you should not be entering another researcher's space without first checking with them.
- Furthermore, due to current Covid19 restrictions and measures, the sharing of keyboards and workspaces should be limited, and areas wiped down and disinfected between uses.
- Training for specific equipment must be carried out by the Supervisor or a Technician. This must be carried out before the student is permitted to work in the lab.
- The fume cupboard is for experiments only, and **NOT** for storage. A booking system is in place for times of heavy usage.
- All borrowed equipment or glassware must be signed for in the loan book.
- Used glassware must be cleaned and returned to the cupboard or if borrowed returned to the Technician/Supervisor.
- When the fire or gas alarm sounds for more than 15 seconds, you should leave the building immediately through the nearest exit. Muster outside the main entrance of Fraser Noble. Do not wander off without mustering or letting the Lab Coordinator and/or your immediate Supervisor know that you have safely evacuated the building. Alarms are tested every Wednesday morning for approximately 10 seconds.
- **Emergency numbers (University Security):**
 - **Internal - 3939**
 - **External - 01224 27 3939**
- Ventilation is controlled by Estates. If you notice that the ventilation is not on, you should leave the lab and notify the Lab Technician/Coordinator.
- **You must not bring friends or other unauthorised users into the lab.**

- All authorised visitors should wear lab coats and safety glasses.
- Do not bring food or drinks into the lab. Furthermore:
 - Do not eat or drink in the lab (including chewing gum).
 - Do not put food wrappers or drinks bottles in the waste bins inside the lab.
- Do not use a mobile phone or headphones/earphones whilst in the lab.
- Outdoor coats and bags should not be brought into the lab.
- Broken glassware must be disposed of immediately in the broken glassware box by the door. Contaminated broken glass should be dealt with as per lab induction instructions.
- Notify Technicians so broken items may be replaced, if appropriate.
- All containers containing chemicals must be labelled with initials, contents, and date. The container must be appropriate for the substance (material and type).
- Be knowledgeable about all activities taking place in the lab – not just those you are involved in – so that you can respond accordingly in case of an emergency. Similarly, you should be able to identify every user of the lab, know whom they work with, and know how they can be contacted.
- The lab is used for research. You are not permitted to take photos of anything in the lab without the permission of the Supervisor, the Lab Coordinator, or the designated Lab Technicians .
- Do not make personal calls from the lab.

Review Record

| Issue | Who | Date | Reason for Review |
|-------|------------|------------|---|
| 2 | JBR/es/HHa | 10/02/2023 | Update adding section on ultrasonic homogenizer, reformatted. MSDS replaced with SDS. Reviewed and approved by the Lab Coordinator (HHa). |
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