

Resistance Laboratory Cottrell 3B140

This space is used for undergraduate teaching and undergraduate and post graduate research. There is a wide range of general physiology equipment.

Health and Safety information

Emergency Procedure: there is an emergency procedure notice on the wall next to the telephone. Please familiarise yourself with this procedure and your location within Pathfoot building.

Defibrillator: The automatic defibrillator is situated on the wall in the corridor annex to Lab Manager's office, Room 3B142C, Combination lock entry: c2567Z .

Fire: There are two fire extinguishers located on 3B corridor, within 50 metres of the physiology lab, for use in the event of a lab fire. If the fire alarm sounds, all lab users must leave the laboratory, leaving all bags and belongings behind, and congregate at the meeting point in the car park outside the main entrance.

Out of hours and lone working: University policy (refer to safety hand book on guidance on safety in research located on the Occupational Risk & Environmental sustainability Home Page). All lab users must act responsibly and safely while working in the sports laboratories.

First Aid box: By the door in the Nutrition lab .

First Aiders: A list of first aiders is on the main door to the laboratory

Reporting accidents and incidents: minor injuries are reported to the departmental First Aider or Safety Advisor and in case of emergencies follow the emergency control procedure to arrange for emergency service response.

Risk assessments: are held on the Health and Safety Information web pages. A Passport/permit to work is required for all lab users, this is obtained as part of the laboratory induction prior to commencing any research work.

Laboratory Rules

Note: Wash hands before commencing lab work and again before leaving the laboratory

- You must attend a laboratory induction before you start work
- Always wear personal protective equipment as required – Minimum requirement: lab coat and disposable gloves, safety glasses may be worn when dispensing blood and urine samples.
- Clean workstation bench with detergent and then 70% ethanol before commencing lab work
- Food and drink is permitted in this laboratory but should be for participant use and must only be consumed in designated, marked areas away from sample taking and handling.
- Mobile phones are not permitted to be used when wearing gloves e.g when texting, receiving or making calls or for use as a timer.
- Labelling of samples/solutions – minimum requirements: solution name, initials and date and expiry date if applicable
- Safe operating procedures (SOPs) are available in the holders adjacent to equipment. Your supervisor may provide additional SOPs. Pay attention to pre use equipment checks.
- Manufacturers manuals are also available in the holders adjacent to equipment
- Waste disposal: Normal (Black bag) and clinical waste (Yellow bag). Do not overfill bins and inform a member of staff when $\frac{3}{4}$ full. Clinical waste bags are stored with Ronnie Balfour at BES stores for specialist uplift.
- Fridge/Freezer storage – Space is a premium! Always label boxes, tubes, bags etc. according to the labelling criteria above and ask if you require long term fridge or freezer storage space.
- Lab books should be updated every time you carry out or complete an experiment. Always include materials used in write up and remember to document any deviation from protocol, while it's fresh in your memory.

Good practice equals more reproducible and reliable results!

Risk assessment / Control Procedure

Faculty	Health Science and Sport				
Head of Faculty	Professor Jayne Donaldson				
Safety Officer	Doctor Nidia Rodriguez-Sanchez				
Completed by	Chris Grigson				
Change log	Version 1.1	07 Sept 2022	Added change log		
	Version 1.2	08 June 2023	Removed Covid 19 specific content Amended Cardiopulmonary testing		
Date	20/05/2020				
Reviewed	04/07/2023	By:	CG	Next review due	08/2024

The activity

Activity	Use of Resistance Laboratory
Equipment used	See hazards
Categories of people involved	Staff, UG, PG, Visitors, Young persons
Location of activity	Cottrell 3B140 Resistance Laboratory
Duration of activity	Continual
Frequency of activity	Continual
Legal compliance to standards and regulations required	PUWER, HASAWA, MHSWR, COSSH

Hazard categories

Ethical approval requires hazards to be ascribed to a category. Use the following categories when describing the hazards in the table on the next page. Mark each category that applies clearly below.

<p>F1. Working in a dangerous area: e.g. high crime area, area of civil/political unrest, psychiatric unit or prison. Check with the Foreign and Commonwealth Office Travel Website and with University Insurance Officer prior to travel overseas. Discuss risk assessment/control measures with the management of any institution involved or with local police/law enforcement.</p> <p>- Take into account the possibility of psychological injury (trauma/PTSD and stress) as well as physical injury.</p> <p>- Give contact details and measures to be taken in case of emergency.</p>	<p>Yes</p> <p>No</p>
<p>F2. Working in an isolated geographical area: An isolated geographical area can include city parks, urban brownfield site as well as a remote hillside or a valley.</p> <p>- Take into account physical isolation through distance, screening effect of shrubbery/woodland or lack of mobile phone signal, etc. rather than just distance from “civilisation”.</p> <p>- Give contact details and measures in case of emergency.</p>	<p>Yes</p> <p>No</p>
<p>F3. Lone working: Lone working can include unaccompanied visits to research subjects in their own home, etc., as well as working alone in the field. Working alone in an office environment with access to a phone is not usually categorised as “lone working”.</p> <p>- Give contact details and measures in case of emergency</p>	<p>Yes</p> <p>No</p>
<p>F4. Working with equipment: Please detail the risks associated with this</p> <p>- Give the manufacturer and model</p> <p>-Take into account how the equipment and users are affected by the location</p>	<p>Yes</p> <p>No</p>
<p>F5. Environmental hazards: e.g. extremes of weather (temperature, wind speed, ice, etc.), rough terrain, animals, plants, earthquake, water quality, contaminated land, derelict/unstable buildings are examples of factors to be considered here.</p>	<p>Yes</p> <p>No</p>
<p>F6. Chemical & biological hazards: e.g. laboratory and other chemicals and mixtures (eg, oils, acids, chemical wastes (pre-existing or generated during the project), detergents, crop spraying or fumigation, diseases (of humans, animals or plants).</p> <p>- If this section is applicable, a full COSHH risk assessment will always be required.</p>	<p>Yes</p> <p>No</p>
<p>F8. Emotional risks: e.g. sensitive research. This can include many areas that can be emotional triggers – research with or regarding children, animals, conflict (war, terrorism, holocaust studies, etc.), and natural disasters are examples.</p> <p>- The predisposition of the individuals should always be taken into account as an individual’s emotional triggers depend very much upon that individual’s personal/family history.</p>	<p>Yes</p> <p>No</p>

The Hazards

*Details under relevant heading in appendix

All hazards other than category F.6 (Chemical and biological hazards) should go here

Faculty / Service Area:		Health Science and Sport		Location:		3B140			
Description of work task / equipment /area being assessed:									
Use of laboratory									
What are the hazards?	Hazard category	Who might be harmed and how?	What are you already doing to control the risks?	*Risk rating	What additional controls (if any) are required to reduce the risks?	*Risk rating	Action by who?	Action by when?	Date of completion
Use of resistance exercise machines	F4	Investigators participants a. Overexertion leads to adverse health effects b. Slips, trips and falls cause cuts bruises and abrasion c. Crushing, trapping by weights and bar cause crushing and cuts	a. RA03, RA04 b. and c. Instruction, SOP, Inspection of machine and accessory storage		Monthly inspection		Competent person	Continual	
Free weight lifting	F4	Investigators participants	a. RA03, RA04		Monthly inspection		Competent person	Continual	

		<ul style="list-style-type: none"> a. Overexertion leads to adverse health effects b. Slips, trips and falls cause cuts bruises and abrasion c. Pinching, trapping, impact by free weights leads to breaks, crushing and cuts 	<ul style="list-style-type: none"> b. and c. Instruction, SOP, Inspection of weights 						
Cardiopulmonary testing	F4	<p>Investigators participants</p> <ul style="list-style-type: none"> a. Infection from contaminated parts – transmission of respiratory diseases including Covid 19 b. Low oxygen c. Use of compressed gas cylinders 	<p>RA18</p> <ul style="list-style-type: none"> Instruction, SOP Sterilisation Good housekeeping Use of microbial filters Weekly inspection 						
Portable Dynamometers	F4	<p>Investigators and participants</p>	<ul style="list-style-type: none"> a. RA01, RA02, RA03, RA04 b. Instruction, use of mats 						

		<ul style="list-style-type: none"> a. Overexertion leads to adverse health effects b. Slips, trips and falls cause cuts bruises and abrasion 							
Clinical Waste		Investigators and participants Infection	RA09 Weekly inspection of housekeeping						
Body fluid sampling		Investigators and participants Infection	RA08 Weekly inspection of housekeeping						
Anthropometry	F4	Investigators and participants <ul style="list-style-type: none"> a. Overexertion leads to adverse health effects b. Slips, trips and falls cause cuts bruises and abrasion 	<ul style="list-style-type: none"> a. RA07 b. Instruction, use of mats 						
Lone working	F3	Investigators and participants	See University policy	3					

		<ul style="list-style-type: none"> a. Increased exposure to hazards due to lack of assistance from co-workers b. Stress and fatigue lead to poor health and function c. Increased risk of harm associated with isolation in case of an incident 	<p>Laboratory users instructed not to work alone or out of hours unless necessary</p> <ul style="list-style-type: none"> a. Laboratory users instructed to take extra care and be aware that they are at a greater risk. Also not to perform hazardous activities. b. Lone workers in regular contact with their supervisors or line managers who monitor stress and wellbeing. c. Lone workers instructed to inform other available and competent staff of their schedule, location and contact information. For longer periods of work or more hazardous activities, periodic check – ins are required. Emergency procedures, first aid kit and telephone available in each room 						
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			Instruction given in SOPs and induction						
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COSHH Section

Anything in category F.6 (Chemical and biological hazards) should go here

*Details under relevant heading in appendix

Manufacturers COSHH data sheets are required for all chemical hazards

The Substance What are the hazards and *classification? *Route of exposure	*WEL mg/m3	Who might be harmed and how?	What are you already doing to control the risks?	*Risk rating	What additional controls (if any) are required to reduce the risks?	*Risk rating	Action by who?	Action by when?	Date of completion	Health monitoring
Drierite indicating dessicant Irritant: Skin Eyes Respiratory	Calcium Sulphate TWA 5 Cobalt Dichloride TWA 0.02	Investigators, Students Skin, Eye, Respiratory irritation	Provide Eye goggles, nitrile gloves Instruction on PPE during induction and in SOP General Advice: Move out of dangerous area. Consult a physician. Inhalation: Move person into fresh air. Seek medical advice. Skin Contact: Wash off with soap and water. If irritation	2						No

The Substance What are the hazards and *classification? *Route of exposure	*WEL mg/m3	Who might be harmed and how?	What are you already doing to control the risks?	*Risk rating	What additional controls (if any) are required to reduce the risks?	*Risk rating	Action by who?	Action by when?	Date of completion	Health monitoring
			<p>develops consult a physician.</p> <p>Eye Contact: Rinse thoroughly with water for at least 15 minutes. If irritation develops consult a physician.</p> <p>Ingestion: Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a Physician</p>							
<p>Miltos sterilising solution</p> <p>Irritant</p> <p>Skin</p> <p>Eyes</p>		<p>Investigators, Students</p> <p>Skin irritation, Eye irritation</p>	<p>Provide Eye goggles, washing up gloves</p> <p>Instruction on PPE during induction and in SOP</p>	2						No

The Substance What are the hazards and *classification? *Route of exposure	*WEL mg/m3	Who might be harmed and how?	What are you already doing to control the risks?	*Risk rating	What additional controls (if any) are required to reduce the risks?	*Risk rating	Action by who?	Action by when?	Date of completion	Health monitoring
			<p>Instruction – In case of contact with eyes rinse immediately with plenty of water for least 5 minutes.</p> <p>In case of contact with skin, wash affected area thoroughly with water.</p>							
<p>Decon 75 detergent</p> <p>Irritant</p> <p>Skin</p> <p>Eyes</p>		<p>Investigators, Students</p> <p>Skin irritation,,Eye irritation</p>	<p>Provide Eye goggles, washing up gloves, lab coat</p> <p>Instruction on PPE during induction and in SOP</p> <p>Instruction – In case of contact with eyes rinse immediately with plenty of clean,</p>	2						No

The Substance What are the hazards and *classification? *Route of exposure	*WEL mg/m3	Who might be harmed and how?	What are you already doing to control the risks?	*Risk rating	What additional controls (if any) are required to reduce the risks?	*Risk rating	Action by who?	Action by when?	Date of completion	Health monitoring
			<p>flowing water and seek immediate medical attention.</p> <p>In case of contact with skin, rinse immediately with plenty of clean, flowing water. Seek medical attention if there is persistent irritation.</p>							
<p>Compressed gas Dry N2</p> <p>Toxic-Asphyxiant</p> <p>Inhalation</p> <p>Explosion</p>		<p>Investigators, Students, Participants</p> <p>Asphyxiation in high concentrations if Gas released in confined space or there is insufficient ventilation</p> <p>The bottle could explode if heated or if</p>	<p>On demand valve prevents release of gas when not connected to sample pump</p> <p>Small bottle size reduces potential explosive force and limits the total</p>	2	Use piped external supply	1	Estates	Completion of new laboratory	2021	No

The Substance What are the hazards and *classification? *Route of exposure	*WEL mg/m3	Who might be harmed and how?	What are you already doing to control the risks?	*Risk rating	What additional controls (if any) are required to reduce the risks?	*Risk rating	Action by who?	Action by when?	Date of completion	Health monitoring
		the bottle or valve is physically damaged leading to cuts and lacerations	<p>quantity of gas released</p> <p>Only competent staff in good health allowed to handle gas bottles. Instruction on use: in well ventilated areas, safe valve removal. PPE gloves and goggles</p> <p>Reduce exposure and Prevent physical damage to gas bottle by storage in external gas store when not in use, instruction on safe handling, bottle to be kept on its side at all times and safe transport.</p>							

The Substance What are the hazards and *classification? *Route of exposure	*WEL mg/m3	Who might be harmed and how?	What are you already doing to control the risks?	*Risk rating	What additional controls (if any) are required to reduce the risks?	*Risk rating	Action by who?	Action by when?	Date of completion	Health monitoring
<p>Compressed gas O2,C02,N2 mix</p> <p>Harmful – Increases respiration</p> <p>Inhalation</p> <p>Explosion</p>		<p>Investigators, Students, Participants</p> <p>Exposure to build up of gas mixture could result in increased respiration due to high CO2 concentration.</p> <p>Increase respiration may lead to loss of consciousness or heart issues in vulnerable individuals.</p>	<p>On demand valve prevents release of gas when not connected to sample pump</p> <p>Small bottle size reduces potential explosive force and limits the total quantity of gas released</p> <p>Only competent staff in good health allowed to handle gas bottles. Instruction on use: in well ventilated areas, safe valve removal. PPE gloves and goggles</p>	2	Use piped external supply	1	Estates	Completion of new laboratory	2021	No

The Substance What are the hazards and *classification? *Route of exposure	*WEL mg/m3	Who might be harmed and how?	What are you already doing to control the risks?	*Risk rating	What additional controls (if any) are required to reduce the risks?	*Risk rating	Action by who?	Action by when?	Date of completion	Health monitoring
			Reduce exposure and Prevent physical damage to gas bottle by storage in external gas store when not in use, instruction on safe handling, bottle to be kept on its side at all times and safe transport.							

Append supplier safety data sheets for all substances here:

Drierite

Miltons

Decon 75

Nitrogen Calibration gas

Air Mix Claibration gas

Appendix

Risk ratings

Risk ratings are a way of evaluating risk. A risk is defined as the likelihood that a hazard will cause harm combined with the severity of the harm. We can apply a value to a risk by using the following formula and matrix.

$$\text{Risk} = \text{Likelihood} \times \text{Severity}$$

Likelihood	Severity				
	Trivial	Minor Injury	Over 3 Day Injury	Major Injury	Incapacity or Death
Highly Unlikely	1	2	3	4	5
Unlikely	2	4	6	8	10
Possible	3	6	9	12	15
Probable	4	8	12	16	20
Certain	5	10	15	20	25

Risks can then be prioritised by their rating

- 1 Urgent Action - (Risk 15 - 25)
- 2 High Priority - (Risk 10 - 12)
- 3 Medium Priority - (Risk 5 - 9)
- 4 Low Priority - (Risk 2 - 4)
- 5 Very Low Priority - No Action Required (Risk 1)

This gives the leads to the residual risk: Low (Risk 1-4), Medium (Risk 5-9), or High (Risk 10 to 25). If the risks are acceptable (Low Risk) then you may feel able to proceed without further action. If the risk is Medium or High then you must do something to bring the risk to a "tolerable" level.

Controls measures

Control measures are actions that reduce the risk to a tolerable level. Controls should be chosen to reduce the severity and or likelihood of a risk. Controls should be applied in an order of preference or Hierarchy of Controls:

1. Elimination – Remove the hazard
2. Substitution – Exchange the risk for something less likely or severe
3. Physical Controls – separation or isolation, prevent contact with the hazard
4. Administrative controls - safe operating procedures to ensure safe interaction with hazard
5. Information, instruction, training & supervision – warn people of the hazard and tell or show them how, or help them to deal with it.
6. Personal Protective Equipment – dress people to reduce severity of harm

COSHH section

The Control of Substances Hazardous to Health Regulations 2002 require additional specific risk assessment for hazardous substances. Fill in the COSHH section for any of the substances identified under hazard category F.6 . Control is adequate when the risk of harm is 'as low as is reasonably practicable'. This means you need to demonstrate that:

1. All control measures are in good working order.
2. Exposure is below the Workplace Exposure Limit, where one exists.
3. Exposure to substances that cause cancer, asthma or genetic damage is reduced to as low a level as possible.

“A brief guide to COSHH”: <https://www.hse.gov.uk/pubns/indg136.htm>

Workplace exposure limits (WEL)

There is a maximum exposure to hazardous substances defined by law. These workplace exposure limits are given in the following document.

“EH40/2005 Workplace exposure limits”: <https://www.hse.gov.uk/pubns/priced/eh40.pdf>

COSHH Hazard classifications

This information should be given on the exterior of the container and on the COSHH data sheet supplied with the hazardous substance.

- Very Toxic
- Toxic
- Corrosive
- Harmful
- Irritant
- Sensitiser
- Dust
- Teratogenic
- Carcinogen or suspected carcinogen
- Microorganism
- Possible long term effects

COSHH Routes of exposure

Routes of exposure are the different ways hazardous substances interact with the body. There may be more than one route.

- Contact damage to skin or eyes
- Injection
- Absorption through skin
- Ingestion
- Inhalation

COSHH Supplier Safety data sheets

Attach the supplier safety data sheet to the risk assessment for each substance covered.

Safe operating procedures

The faculty provides safe operating procedures for many activities these can be found on the health and safety web pages and in the folders located near any equipment they apply to. The activity you are planning may require an additional procedure to be written as a control. Contact the safety officer for help with this as they may be able to identify similar activities the procedure should apply to. They will also be able to advise on a suitable format and wording.

Pre operation equipment checks

Pre operation checks are detailed in operating procedures found on the health and safety web pages and in the folders located near any equipment they apply to. Fill in the form provided each time you use the machine. Report any issues you encounter in your check and leave a note on the machine. Do not be tempted to skip pre operation checks. Faulty machinery can cause injury.

Resources, instruction, information, supervision and training

In addition to the resources mentioned elsewhere. Manufacturer user manuals are available from the health and safety webpages <https://sportsiencesafety.stir.ac.uk> and in the folders by the equipment. Training and supervision are arranged as part of the laboratory induction. Remember, you must not work in any laboratory without obtaining authorisation for the activities you wish to undertake as part of an induction. Inductions should be repeated on a regular basis as indicated on your induction record. If further instruction, training or supervision is required, please contact the person in charge of the laboratory.

Records, reporting faults

Every time you use a piece of equipment you should fill in the use form in the folder located nearby and note any faults you experience. This is important as adequate maintenance requires monitoring and maintenance periods are determined by the amount of use.

Where does this all come from?

As part of your University induction and regular training you should have taken a set of compulsory courses

<https://www.stir.ac.uk/about/professional-services/estates-and-campus-services/safety-environment-and-continuity/safety/induction-courses/>

The University has further information available on their health and safety pages

<https://www.stir.ac.uk/about/professional-services/estates-and-campus-services/safety-environment-and-continuity/safety/>

The Sport Science health and safety pages are here

<https://sportsiencesafety.stir.ac.uk>

Employers, employees and people who own buildings have a legal duty to their own safety and the safety of any others who may be affected by their activities. This mainly comes from the Health and Safety at Work act 1974 (HASAWA) and the Management of Health and Safety at Work Regulations 1999 (MHSWR). Substances used in the workplace must be used in accordance with The Control of Substances Hazardous to Health Regulations 2004 (COSHH). Work equipment must be suitable, safe and well maintained in accordance with The Provision of Work Equipment Regulations (PUWER). Further regulations apply to machinery. Machinery is a special category of work equipment which usually incorporates a motor. The legal requirements are summarised in guidance provided by the Health and Safety Executive. The guidance is much easier to read and can be found on the HSE web site.