

**Centre for Research in Engineering Surface Technology
CREST**

SAFETY STATEMENT

2014



Version	Date	Name
1.0	June 2014	Swarna Jaiswal

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CREST CONTACT DETAILS

Role	Name	Location	Email	Telephone
Head of CREST (Centre Manager)	Brendan Duffy	Basement, FOCAS	Brendan.Duffy@dit.ie	01 402 7964
Head of School of Chemical & Pharmaceutical Sciences	Declan McCormack	Room 340, Kevin Street	Declan.mccormack@dit.ie	01 402 4778
Senior Materials Engineer	Annaik Genson	Basement, FOCAS	annaik.genson@dit.ie	01 402 7945
Nominees to Health & Safety Team	Swarna Jaiswal	Basement, FOCAS	swarna.jaiswal.@dit.ie	01 402 7948
Senior Research Manager	Mohamed Oubaha	Basement, FOCAS	mohamed.oubaha@dit.ie	01 402 7984
First-aiders	Paddy Kane	Basement, FOCAS	patrick.kane@dit.ie	01 402 7946
	Garrett Melia	Ist floor, FOCAS	garett.melia@mydit.ie	01 402 7995
	Paul Quinn	Ist floor, FOCAS	paul.m.quinn@dit.ie	01 4027943
	Killian Barton	Ist floor, FOCAS	killian.barton@dit.ie	01 4027991
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Please see [Crest Contacts](#) for full listing

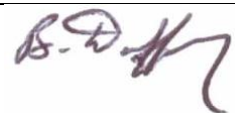





EMERGENCY CONTACT NUMBERS

Emergency Services	112/999 (You may need to dial “0” for an outside line)
Hospital	01 410 3000 St. James Switchboard
Dublin City Council	01 222 22 22
Garda Síochána, Kevin Street	01 666 9400
Bord Gáis 24 hour emergency line	1850 20 50 50
ESB 24 hour emergency line	1850 372 999
Health and Safety Authority	1890 289 389
Samaritans	1850 60 90 90
Environmental Protection Agency	1890 33 55 99

BUILDING & CAMPUS CONTACT DETAILS

Front Desk/Reception	FOCAS	01 402 7900 / 01 402 7902 / 01 402 7903
	Kevin Street Main Building	01 402 4625
	Annexe, Kevin Street	01 402 4612
Incident Controller	Porter on Duty	01 402 4625 Kevin Street
Building Service Supervisor	Jimmy Kane	01 402 4797
Building Maintenance Manager	Colm Gillen	01 402 4646 / 087 2888 294
Occupational Health Officer	Yvonne McArdle	01 402 4603 / 087 9809 135
Health and Safety Officer	Edel Niland	01 402 4192 / 086 3891 080
Student Health Centre	Reception	01 402 3051
Chaplain	Fionnuala Walsh	01 402 4568 / 086 875 4422
Employee Assistance Programme (EAP) Contact	VHI Corporate Solutions	Freephone 1800 995 955 (24 hours / 7 days a week / 365 days a year)
Student Counsellors	Nita Whelan / John Broderick	01 402 3052 / 01 402 3155
Staff Safety Representative	TBC	TBC

LIST OF PERSONS IDENTIFIED AS BEING RESPONSIBLE FOR HEALTH AND SAFETY TASKS

TASKS	RESPONSIBLE PERSON	SIGNATURE
Coordinating and ensuring records are maintained for training and provision of Personal Protective Equipment (These records can be found in the Training Folder in the Controlled Records of the CREST QMS)	Brendan Duffy	
Ensuring Safety Statement, risk assessments are carried out, updated and communicated (These records can be found in the Staff Risk Assessments in the Health and Safety Records of the CREST QMS)	Brendan Duffy	
Ensuring the upkeep of first-aid box and ordering first-aid supplies from Occupational Health Officer (This is coordinated through the Focas management team)	Brendan Duffy	
Co-ordinating contractors activities and dealing with Buildings Office for Work Permits (This is coordinated through the Buildings Office and Focas management team)	Brendan Duffy	
Updating the statutory registers and Safety Data Sheets (These records can be found in the CREST chemicals database folder which is available of the common Focas network drive and the CREST QMS)	Brendan Duffy	
Ensuring adequate personnel designated as fire marshals and first-aiders (These records can be found in the Training Folder in the Controlled Records of the CREST QMS)	Brendan Duffy	

INTRODUCTION

Dublin Institute of Technology (DIT) is required under the provisions of the *Safety, Health and Welfare at Work Act 2005*, to have and bring to the attention of all employees, a statement of its policy, organisation and arrangements with respect to health, safety and welfare at work. The Act also embraces all of the activities at DIT and staff, students, visitors, contractors/service providers.

The fundamental aim of the *Safety, Health and Welfare at Work Act* is the prevention of accidents and illnesses at the place of work. Safety consultation procedures and the preparation of a Safety Statement and written risk assessment are the key provisions of the Act.

This Safety Statement has been prepared in compliance with the Act and provides details of the specific hazards relevant to CREST and the controls that have been implemented to adequately safeguard the activities.

This Safety Statement should be read in conjunction with the DIT Parent Safety Statement which is available on the [health and safety website](#).

This document applies to all staff, students, visitors, contractors/service providers and campus users. It will be updated as necessary in the light of new legislation, staff feedback, changes and practical experience. In addition it will be reviewed annually.

SAFETY POLICY & OBJECTIVE FOR CREST

CREST will ensure that:

- Work activities are managed and conducted in a manner that ensures the safety, health and welfare of our employees, students, visitors and contractors/service providers
- Our Safety Statement is maintained and updated and written risk assessments are carried out and reviewed as required and brought to the attention of all employees at least annually
- Identified protective and preventative measures are implemented and maintained
- Improper conduct likely to put an employee, student, visitor or contractor/service provider's safety and health at risk is prevented
- A safe place of work is provided that is adequately designed and maintained
- A safe means of access and egress is provided
- Safe plant and equipment are provided
- Safe systems of work are provided
- Risks to health from any article or substance are prevented
- Appropriate information, instruction, training and supervision are provided
- Where hazards cannot be eliminated suitable protective clothing and equipment are provided
- Emergency plans are prepared and revised
- Welfare facilities are provided and adequately maintained
- Competent personnel who can advise and assist in securing the safety, health and welfare of employees are employed when required

Signed:



CREST Manager : Brendan Duffy:

Date: 04/09/2014

SCOPE OF SAFETY STATEMENT

Centre for Research in Engineering Surface Technology (CREST) has 14 staff members and is located in the FOCAS Institute, IDT, Camden Row, Dublin 8.

CREST uses the following rooms/locations within the FOCAS Institute:

- MSA Laboratory Room 205
- Consultancy Laboratory: Basement
- Sample Prep Laboratory: Basement
- BET/TEM/XRD Room (ionizing radiation)
- SEM Laboratory

CREST has 14 members including:

- 3 staff members
- 3 post doctorates
- 6 postgraduates
- 1 Head
- 1 independent consultant

Our mission is to provide new opportunities for Ireland's economic growth through superior customer service, excellence in innovation, consultancy, education and training in surface coating and advanced material technologies.

CREST Strategy

CREST Centre is the only dedicated surface coatings laboratory on the Island of Ireland. It exists to serve the SMART economy by means of translating in-house fundamental knowledge from the bench-top to the market. This is particularly relevant based on the National Strategy for Higher Education to 2030 published by Colin Hunt (January 2011), which emphasise that the *'Higher education research will need to connect to enterprise and society in new and imaginative ways to harness its potential for economic and social well-being, including a more effective approach to knowledge transfer and commercialisation'*. CREST model (see below) relies on an expert and professional coatings consultancy service to front-face its activity. Companies with a commitment to develop an innovative technical capability, recognise the capabilities in the Centre and in time view the Centre as an extension of its own R&D capability.

The Centre has over sixty years of commercial surface coating experience to provide this level of service. CREST recruits and develops industrial development scientists with a product development background operating within an ISO 9001 Quality Management System to guarantee consistent and reliable project delivery. Product development needs to be sustained, as secret know-how and craft can quickly become obsolete, therefore, robust intellectual property (IP) development that has sustained market value requires long-term focused strategic investment in fundamental research.

CREST recruits, trains and supervises scientists from undergraduate to postgraduate level. CREST model has facilitated both rapid-turnaround and long-term technology development activities and nurtured the synergies between both, in addition to feeding the undergraduate, post-graduate and publication pipeline for the relevant CRESTs within the Dublin Institute of Technology.

Consultancy

Our expertise ranges from material surface characterisation to the development of novel surface coating solutions for diverse industries. Advancements in surface technologies demand a thorough assessment on formulation, quality and performance of coatings. This requires the use of specialised instrumentation as well as skilled researchers. With this in mind, the Centre has expanded its field of expertise and is now able to offer the scientific and industrial communities a

wide range of tests that comply with the requirements from international standards (ISO, BS, EN and ASTM). We are committed to on-going training, which allows us to keep up with new technologies and assessment methods.

We focus on meeting our client's needs on:

- Solvent and water borne and powder coatings
- Metallic and inorganic coatings
- Physical and chemical Testing
- Corrosion Control
- Innovation through R&D
- Technical/ Legislation support
- Specification and Validation

We provide surface solutions for industries such as:

- Electronics
- Aerospace
- Architectural
- Civil Engineering
- OEM Engineering
- Medical Device
- Hygiene

CREST Centre is the National Approval Laboratory for:

- NRA Approval System
- Department of the Environment VOC validation
- NSAI QC on public schemes

HISORY OF LOCATION

The Centre for Research in Engineering Surface Technology (CREST) is the result of scientific research and investigation focused on solutions for enterprise. Its precursor was the Institute for Industrial Research Standards (IIRS) established in 1946. The IIRS was set up by the Irish state to encourage scientific research to improve the national industries. The Institute helped existing and emerging industries by developing innovative technical processes, ensuring conformity with standard specifications and driving the use of the natural resources of the State. In 1987, the IIRS merged with the NBST (National Board of Science and Technology) to form what was to be known as EOLAS.

In addition to the functions assigned to the Institute and the Board, this new agency prepared and periodically reviewed the national programme for science and technology. It also worked towards the application of science and technology for industrial purposes. Seven years later and following the merger with the indigenous industry wing of the IDA, this agency transformed into Forbairt.

Forbairt (an agency within Forfás) provided services to support State industrial development. It served as an advisor for owners and managers of private-sector companies.

The need for an agency that would give an integral solution to industry and enterprise revolutionized the semi-state agencies. Following this initiative, Enterprise Ireland (EI) was formed in 1998. With EI's establishment came the dissolution of Forbairt and An Bord Tráchtála. This newly formed agency focused mainly on developing industry and enterprise in the State and to strengthen the skills base of the Nation.

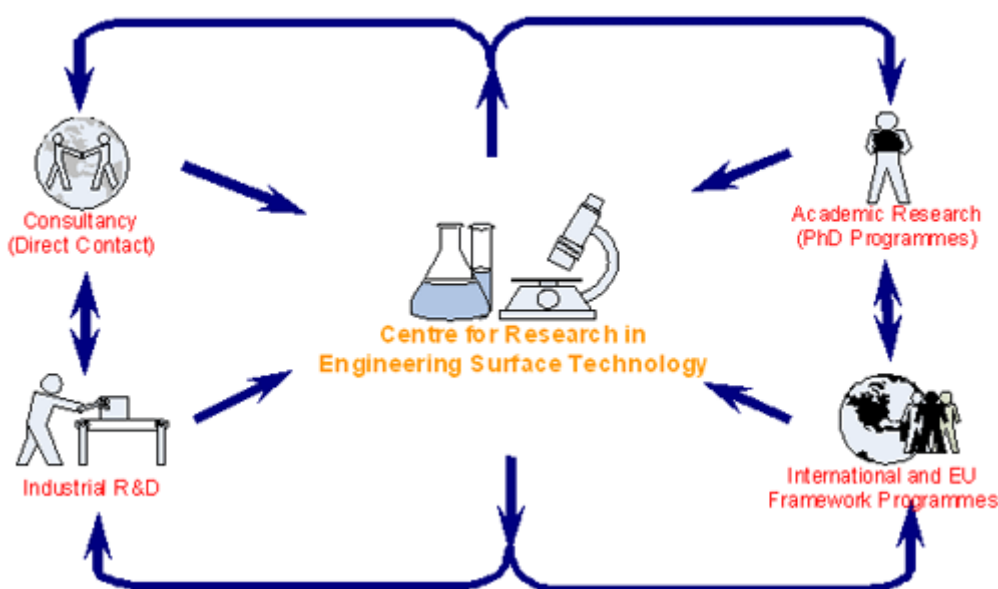
Although Enterprise Ireland did an outstanding job at promoting the growth of industries in the State, research and product development had reached a plateau. It was then that the Dublin Institute of Technology (DIT) and Enterprise Ireland (EI) sponsored the founding of CREST. This Centre was set up, to boost and combine the Institute's research activity in favour of the industrial and academic communities.

The Centre offers services ranging from material surface characterization and corrosion control to the development of coatings and Nano-materials for diverse industries. CREST is capable of providing its clients with thorough materials analysis using Field Emission Scanning Electron Microscopy (FESEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Fourier Transform Infrared Analysis (FTIR), surface profile mapping, and optical microscopy. Corrosion experts develop a complete scheme of design, corrosion resistant alloys and maintenance for new and existing structures and materials.

CREST is also involved in product development, technical investigation, consultancy, training and troubleshooting for a wide range of companies. CREST Consultancy provides a professional service to clients where a wide range of testing in the areas of corrosion control, paint application and dispersion, physical testing and materials characterisation. CREST is the National Approval Laboratory for the NSAI and the NRA and assists government agencies such as the OPW. Some of the Centre's clients are: Fleetwood Sherwin Williams Ltd., General Paints Ltd., Dublin City Council, National Roads Authority, Office Public Works, the Electricity Supply Board, the National Standards Authority of Ireland, Roadbridge Ltd, SIAC Construction and ABB Ltd.

The headquarters of the Centre for Research in Engineering Surface Technology are located in the heart of Dublin City and from this location they provide services to their clients throughout Ireland and other European countries. The application of scientific and technological knowledge to fulfil today's market competitive demands, allows the synergy between CREST and its clients to always produce a successful solution.

CREST Model



SAFETY RESPONSIBILITIES

In accordance with the DIT Parent Safety Statement, the Head of CREST, Brendan Duffy, as part of his management function, is responsible for ensuring, so far as is reasonably practicable, the health and safety of persons working, studying or visiting his area of responsibility. In particular he is responsible for the following:

1. To ensure a Safety Statement relevant to operations is prepared which complies with Section 20 of the Safety, Health and Welfare at Work Act
2. To ensure that the Safety Statement is reviewed at least annually and that the DIT Senior Leadership Team (SLT) Health and Safety Sub-committee is notified that the review has been completed and is provided with any updated document which may result from such a review
3. To ensure that all hazards are identified and risks controlled
4. To ensure that regular safety inspections/audits are carried out to monitor compliance with the Safety Statement and legal requirements and to ensure appropriate follow-up action is taken.
5. To investigate all accidents to staff/students/visitors in their area of responsibility and to complete the Incident Report Form as appropriate.
6. To ensure that local emergency plans and first-aid procedures are implemented and that sufficient fire Marshals/first-aid personnel are available
7. To ensure that staff are appropriately trained to carry out their duties safely and to ensure the attendance of staff at designated training courses as appropriate
8. To ensure that all contractors/service providers carrying out work in the area operate under the Buildings Office Permit to Work system
9. Based on risk assessment, to arrange for the provision of adequate and appropriate personal protective equipment for employees including team members

All Institute Staff

All employees/staff have a duty to take responsibility for their own safety, health & welfare and for that of visitors and any other person who may be affected by their acts or omissions while at work.

Statutory Requirement

Chapter 2, Sections 13 & 14 of the Safety Health and Welfare at Work Act 2005 places a number of obligations on employees whilst at work as outlined in this section:

13.—(1) An employee shall, while at work—

- (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 for intoxicants by, or under the supervision of, a registered medical 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 and, as appropriate, undergo such assessment as may 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 or equipment,

(h) report to his or her employer or to any other 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.

(2) An employee shall not, on entering into a contract of employment, misrepresent himself or herself to an employer with regard to the level of training as may be prescribed under *subsection (1)(f)*.

14.—A person shall not intentionally, recklessly or without reasonable cause—

(a) interfere with, misuse or damage anything provided under the relevant statutory provisions or otherwise for securing the safety, health and welfare of persons at work, or

(b) place at risk the safety, health or welfare of persons in connection with work activities

In addition, staff have the following responsibilities:

- To participate in and put into practice all training provided by DIT, to ensure compliance with safety, health & welfare legislation
- To co-operate with those responsible for health and safety
- To familiarise themselves with the contents of the Health and Safety Statement, safety policies and procedures and Codes of Practice
- To assist in the preparation and updating of the CREST Safety Statement
- To assist and co-operate with periodic safety inspections/audits
- To assist in the completion of standard hazard identification control sheets and co-operate with the reporting and investigation of incidents
- To ensure that equipment is operated in a safe manner and good housekeeping standards are maintained at all times
- To promote safe work practices
- To ensure that all safety rules are communicated to students, contractors and visitors, other campus users
- To use equipment only if authorised and trained
- To ensure that any safety measures associated with new equipment/machinery is brought to the attention of the Head of CREST, Brendan Duffy, implemented, documented in the Health and Safety Statement and communicated effectively
- To ensure that they do not carry out repairs or servicing on plant/equipment/machinery unless they are trained to do so, it is isolated and they should ensure that any guards removed to carry out repairs are properly replaced
- To wear appropriate personal protective equipment where required
- To adhere to policies, procedures in the case of lone working/out of hours access
- To report to the Head of CREST, Brendan Duffy any person abusing facilities or equipment
- To select and appoint a Safety Representative
- To notify the Health & Safety Officer of any perceived shortcomings in the safety arrangements

Undergraduate/Postgraduate Students

Students have a legal responsibility not to endanger themselves or others by their acts or omissions. Thus they must:

- Take reasonable care of their own safety and the safety of others
- Co-operate fully with all safety rules and regulations issued by DIT e.g. smoking etc.
- Co-operate with those with responsibility for health and safety
- Not interfere or misuse any specified items of safety equipment or any safety device
- Ensure that equipment is operated in a safe manner and good housekeeping standards are maintained
- Use personal protective equipment (PPE) as necessary. (Students are required to provide their own PPE – laboratory coat, safety glasses etc.)
- Not access or use laboratory/workshop facilities and equipment without the permission of their academic supervisor and where necessary the staff member in charge of these facilities
- Use equipment only if authorised and properly trained
- Report any incident, dangerous occurrence, defective equipment or potential safety hazard to the Head of CREST
- To participate in any safety training programmes facilitated by the Health & Safety Office
- Adhere to policies and procedures in the case of lone working or out of hours access for the FOCAS Institute building

Contractors/Service Providers

The following responsibilities are allocated to contractors/service providers:

- All contractors/service providers will be expected to comply with the Institute's Policy for safety health and welfare and must ensure that their own Safety Statement is made available whilst work is being carried out. It is the Institutes policy that all contractor/service providers have a Safety Statement in accordance with the *Safety, Health and Welfare at Work Act 2005*
- All work must be carried out in accordance with relevant statutory provisions and taking into account the safety of others on the site. The contractor/service provider must have adequate insurance cover
- Contractors/service providers must not commence with any work on the premises or project site until the Contractor Safety Guidelines and other relevant safety procedures are read, understood and accepted (available from Buildings Office). They must complete the e-learning programme for contractors/service providers
- Contractors/service providers will take reasonable care of themselves and others who may be affected by their acts or omissions and will co-operate as appropriate with DIT employees as necessary
- Contractors/service providers must supply at tender stage a Safety Statement, relevant method statements, copies of their public and employers liability insurance and complete the Contractors Compliance Form CCF1 before a contract is awarded
- They will liaise with the local Building Maintenance Manager and obtain work permits as required
- Scaffolding and other access equipment used by contractor's/service provider's employees must be erected and maintained in accordance with current legislation and Codes of Practice
- All plant and equipment brought onto the site by contractors/service providers must be safe and in good working order, fitted with any necessary guards and safety devices and have all necessary certificates available for inspection

- All transformers, generators, extension leads, plugs and sockets must be suitable for industrial use and in good condition. No power tools or electrical equipment of greater than 110 volts should be used outdoors. If it is necessary to use equipment operating from a 220-volt supply, a residual current device with a rated tripping current of 30mA and operation of 30m sec must be used
- Any injury sustained by a contractor's/service provider's employee must be reported immediately to the local Building Maintenance Manager
- Contractors/service providers must comply with any safety instructions given by DIT
- DIT may carry out safety inspections. Contractors/service providers informed of any hazards or defects identified during these inspections will be expected to take immediate action
- DIT must be notified of any material or substance brought onto the site which has health, fire or explosive risks. Such materials must be stored and used in accordance with current recommendations
- Contractors/service providers will be accountable for the maintenance of good housekeeping practices at all times within their respective areas of work
- Contractors/service providers are not allowed to use equipment owned by the Institute unless written permission is received from the Head of CREST and a competent person passes it as being safe

Visitors (a person other than an employee or contractor/service provider)

- Visitors may not be aware of the potential hazards associated with DIT and also may lack familiarity with the Institute's premises/facilities and are therefore a potential risk to themselves and others. All visitors must identify themselves to the relevant DIT personnel and follow all DIT's safety procedures and policies
- Visitors must not enter any area where they do not have the authority to do so. Hazardous areas will be restricted
- They must not interfere with any of the Institutes property, equipment, materials or substances unless they have permission to do so from the person in charge
- They must not remain on the premises any longer than necessary and should return PPE on leaving
- In the event of an evacuation, they will be led to the Assembly Point by their DIT host
- A safety booklet and wallet card is available at Front desk/Reception area and on request
- The DIT Parent Safety Statement is available on the safety website www.dit.ie/safework
- DIT has a [Child Protection Policy](#) available on the DIT website

DISCIPLINARY ACTION

Any member of staff/student who contravenes or fails to manage to work in accordance with current safety health and welfare legislation, the DIT Parent Safety Statement and codes of practice may be subject to the Institute's disciplinary procedures. The Buildings Officer will address any contraventions by contractors/service providers.

HEALTH AND SAFETY CONSULTATION

Employers are obliged under *The Safety, Health and Welfare at Work Act 2005*, to consult with and take account of any representations made by employees regarding health, safety and welfare. CREST ensures that health and safety is an agenda item at all meetings and ensures that working groups are appointed to deal with certain health and safety items if required.

A nominee from CREST sits on the Research & Enterprise Health and Safety Team. This team meets periodically throughout the year, usually every two months.

Consultation takes place when there is a change, update or modification to a particular work process, when new machines or processes are introduced or when new substances or materials are introduced.

The Research & Enterprise Health and Safety Team has selected and appointed Safety Representatives. Details of current Safety Representatives may be found on the health and safety website (www.dit.ie/safework)

PROVISION OF INFORMATION

Staff, students and others are made aware of safety matters by the following means:

- Agenda item at Team/CREST meetings
- Desktop Emergency Response Flip charts
- Health & Safety notice boards
- Health & Safety Newsletters
- Toolbox talks
- Health & Safety Induction
- Health & Safety Training courses
- Signage:
 - Safety notice points
 - Emergency first-aid procedure signs
 - Emergency floor plans
 - Assembly point maps
 - Fire actions notices
- Emergency Response posters
- Safety booklets
- Safety wallet cards
- Website www.dit.ie/safework
- Posters
- Inductions are prepared and delivered by Occupational Health Officers where requested
- The Head of CREST has an email listing of all 14 team members which is used for the dissemination of information

HEALTH AND SAFETY RESOURCES

CREST codes all budgetary spend on activities/spend pertaining to safety, health and welfare. Considerable resources are expended by CREST in securing the health, safety and welfare of employees in terms of personnel, time, materials, equipment and the purchase of goods and services.

Where additional equipment, training etc. is required whether as a result of ongoing risk assessment or legislative change, resources will be allocated on a prioritised basis to meet the identified requirements.

The health and safety website hosts a reference library of videos, texts, literature and other publications on health and safety matters.

SAFE SYSTEMS OF WORK

It is the policy of DIT to ensure that employees are not asked to perform tasks outside their competence and capacity. Safe systems of work have been designed with this objective in mind. As some work activities give rise to risks which can only be controlled by adherence to proper procedures, employees are issued with written safe working procedures which should be adhered to at all times.

CREST SOPs include:

List of SOP's							
03-001 CREST Staff Appraisal				11-009 SU-70			
04-002 Control of CREST Project File Information				11-014D Determination of Contrast Ratio (Opacity)			
04-003D Literature Review and Journal Articles Electronic Storage				11-015D ATD to GCMS			
05-001 Control of Documents & Records Procedure				11-016D Operation of BET Analyser			
05-004 Electronic Backup of Data				11-017D Operation of EDX			
08-001 Customer Property				11-018D Operation of Carbon Evaporation Coater 208C - Master Copy - Rev B			
09-001 Completion & Archival of Quality Records				11-019D Operation of Sputter Coater 208HR			
09-005 Direct Consultancy				13-001 Control of Non Conforming Product			
11-001 External DIT Instrument Use				14-001 Corrective and Preventive Action Procedure			
11-002 Operation of Dispermat				14-002 Customer Complaints			
11-003 EIS Solartron				17-001 Quality System Management Review Procedure			
11-004D Operation of Humidity Cabinet Memmert HCP 246				17-002 Internal Audit Procedure			
11-005 Operation of XRD				18-001 Training and Competence of CREST Employees			
11-006D Contact Angle				18-002 New Employee Induction			
11-007D DSC				50-001 Use of Personal Protective Equipment at CREST			
11-008D TGA				50-002 Risk Assessment & MSDS Storage			
				50-004 Ordering Chemicals Procedures			

Management shall keep a watching brief on safety matters and where necessary adjust or alter systems of work to make them as safe as is reasonably practicable.

PROCUREMENT CONTROL

The purchasing of equipment, plant and substances is subject to the provisions of the *Safety, Health and Welfare at Work Act 2005* and associated regulations, thus all equipment, plant or substances will undergo risk assessment prior to acceptance into the Institute. CREST follows all the guidelines as per the Parent Safety Statement and ensures that a risk assessment is carried out before any equipment/machinery or contractor/service provider is engaged by CREST. Details of equipment/machinery/tools and associated risk assessment is available in the risk assessment.

Chemicals:

Before any new chemical (CMR) which is subject to the restrictions of the Safety, Health & Welfare at Work Carcinogen Regulations 2001 is purchased, it must first receive approval from the Head of CREST. Safety Data Sheets (SDS) and chemical risk assessment for its use must be provided. This information must be attached to the order form. Any employee requiring a new chemical, either for process activity or as a sample, must first obtain an SDS and have available a written risk assessment for use, storage and operation.

Radioactive chemicals and materials:

Employees are not permitted to bring radioactive materials on site without the prior authorisation of the Radiation Protection Officer Dr. Jacinta Brown. Please see radiation in the risk assessment.

Equipment Purchase:

For all new equipment purchased, the purchaser is to ensure that the equipment complies with all ergonomic and safety standards. Machinery suppliers shall be requested to supply all relevant information including specifications for machine guarding, maintenance, noise, fumes, dust, special training needs etc. which will assist in the risk assessment process.

INSPECTION PROCEDURES

All locations of work will be periodically inspected by a representative from the Health & Safety Office accompanied by local management and the Safety Representative. The Head of CREST will ensure non-conformances identified are rectified and a log maintained.

Where in the opinion of the Health & Safety Officer or other competent officer, there is a risk of serious injury and immediate risk to individuals, he/she will have the authority to advise that the activity is stopped until adequate steps have been taken to eliminate risk or if possible reduced to an acceptable level. Where the risk cannot be reduced to an acceptable level and finance is not available, the Head of CREST shall ensure the activity is ceased.

In accordance with statutory requirements, certain examinations, testing and inspections are carried out on specific items.

Table 1 A list of those items, the frequency of inspection and the testing body is presented below

<u>Equipment</u>		<u>Location</u>	<u>Owner</u>	<u>Trainer</u>	<u>Calibration</u>				<u>Log Book</u>		<u>SOP</u>		<u>Risk Assessment</u>
<u>Equipment</u>	<u>Value</u>	<u>Location</u>	<u>Owner</u>	<u>Trainer</u>	<u>Last date</u>	<u>Next date</u>	<u>Method / Procedure</u>	<u>Performed by:</u>	<u>Location</u>	<u>updated Y/N</u>	<u>Y/N</u>	<u>SOP Ref.</u>	<u>Y/N</u>
Memmert HCP 246 Humidity Cabinet	<€10 K	Exposure Lab	AG	AG	14/10/2013	Oct 2014		VWR International	Beside the Instrument. cert of Calibration in CREST office	Y	Y (14/04/2014) temporary SOP	11-004	Y (14/04/2014) temporary RA
XRD	€10–100K	B-14	RF	External Trainer to be sourced	18/11/13	18/11/14	Supplier's procedure. S.O.P. No.: 11-005	Hilton brooks, UK	Beside instrument. Awaiting test and safety report from Hiltonbrooks		Y	11-005	Y
Contact Angle	<€10 K	MSA Lab	SM	BD				Trained CREST staff	Near to the Instrument	Y	Y Draft	11-006	Y
DSC	<€10 K	Sample Prep	BD		Last Use	Out of Order	SOP 11-007, ASTM E 967, ASTM E2253-03	Trained CREST staff	Beside instrument.		Y draft	11-007	
TGA	<€10 K	Sample Prep	BD	AG	Last Use	Perform a calibration before each use	SOP 11-008; ASTM E2040 - 08	Trained CREST staff	Beside instrument.	Y	Y draft	11-008	
FESEM – SU 70 (Imaging)	>€100K	B-12	AG	Outsource - Protrain	21/03/14	21/03/16	BS ISO 16700:2004	Hitachi FSE	Beside instrument. Service Reporting CREST office.	Y	Y	11-009	

Liebisch C.C.T. Cabinet	<€10 K	Exposure Lab	AG		6/3/13	Out of service	Supplier's procedure with UKAS traceability.	John Godrich	Label and log book at instrument. Cert. of Calibration in CREST office			11-010	
"Credit " Humidity Cabinet	<€10 K	Exposure Lab	AG	BD-PQ	23/04/2014	Apr 2015	Supplier's procedure with UKAS traceability.	John Godrich	log book at instrument. Cert. of Calibration in CREST office	Y		11-011	
Liebisch Green Salt Spray Cabinet	<€10 K	Exposure Lab	AG	BD-PQ	23/04/2014	Apr 2015	Supplier's procedure with UKAS traceability.	John Godrich	Log book at instrument. Cert. of Calibration in CREST office	Y		11-012	
SO ₂ cabinet	<€10 K	Consultancy Lab	AG		7/3/13	Out of service	Supplier's procedure with NAMAS traceability.	John Godrich	Log book on instrument & Cert. of Calibration in CREST office	Y		11-013	
Microwave		MSA	RF								N (Manual)	11-014	Y

GC-MS	>€10 0K	Sample Prep	FM	Michael Cleary - Elemen tec	Daily: Automated calibration for MS - Air/Water, Mass calibration; Biweekly: Electron Multiplier.	Daily: prior to any MS analysis	In-house procedure. The instrument has a program that allows calibration against a standard liquid (Cal- Gas), which is stored internally.	Trained CREST staff	Beside instrument. Service Report in CREST office		Y Draft	11-015	Y
BET Analyser	<€10 K	B-14	RF	Daniel Christie	Calibrate before each use with equipment standard.	Calibratio n before each use with equipme nt standard.	Supplier procedure as per operating manual. SOP due date 10- 03-2011	Trained CREST staff	Log Book located beside instrument.		Y Draft	11-016	Y
Dispermat		MSA	PK								N (Manual)	11-018	
Furnace		Sample Prep	RF						Beside the instrument	Y	N (Manual)	11-019	Y
Sheen Cross Hatch Cutter	<€10 K	Consulta ncy Lab	AG	PQ	11/4/12	N/A. Advised by supplier that no recalibrat ion is required. Email confirmat ion on file.	Suppliers Procedure, review once yearly for servicing.	Carbon Group Paint and Equipment	Certificate of Conformanc e in CREST office and recorded in Calibration file			11-020	

25-mm Digital Micrometer	<€10 K	Consultancy Lab	MM	MM	27/11/2013	Nov 2014	NML procedure with traceability	NML	Label on instrument. Cert. of Calibration in CREST office			11-021	
Colour spectrophotometer CE3000	<€10 K	Consultancy Lab	PQ	PQ	18/6/12	Calibration validity extended from 18 Jun 13 to May 2014	Supplier's procedure with NIST traceability.	Optronic Colour Communications Ltd	Label and log book at instrument. Cert. of Calibration in CREST office			11-022	
Retroreflectometer	<€10 K	Consultancy Lab	PQ	PQ	8/9/10	Perform a calibration before each use; Mobile Instrument	FTMS 370 & ASTM 4061	Trained CREST staff	Label on instrument. Cert. of Calibration in CREST office			11-023	
Rotovapor		MSA	EM									11-024	
C&W environmental chamber HCC			AG									11-026	
Sheen Glossmeter	<€10 K	Consultancy Lab	AG	PQ	Calibration carried out daily when in use	Calibration carried out daily when in use	As per instrument manual; ISO 6504-3:1998	Trained CREST staff	Log Book located beside instrument.	Y		11-028	
Haake		Consultancy Lab	AG									11-029	
Humidity cabinet III		Exposure Lab	AG						Beside the instrument	Y		11-030	

Koenig Pendulum	<€10 K	Consultancy	GM	GM	25/9/98	Perform a calibration before each use	BS EN ISO 1522:2001, BS 3900-E5: 1998	Trained CREST staff					11-031	
Carbolite Oven (benchtop)	<€10 K	Consultancy Lab	AG	AG	Calibration carried out daily when in use	Calibration carried out daily when in use	As per in-house procedure (in development)	Trained CREST staff	Log Book located on instrument.	Y			11-033	
QUV radiometer CR 10 (to be calibrated when QUV is replaced, 16/11/1012)	<€10 K	Consultancy Lab	RF		28/9/10		Supplier's procedure with UKAS traceability.	Q Lab	Label on instrument. Cert. of Calibration in CREST office				11-034	
Eirelec Digital Thermometer	<€10 K	Consultancy Lab	AG	PQ	26/11/13	26/11/14	NML procedure with traceability	NML	Label on instrument. Cert. of Calibration in CREST office				11-035	
Elcometer		Consultancy Lab	AG	PQ									11-036	
Q-Sun	<€10 K	Exposure Lab	AG		Calibration carried out routinely in house at defined lamp usage intervals	Out of Order	As per operating manual.	Trained CREST staff	Log Book located beside instrument.	Y	N/A		11-037	N/A

QUV (Instrument to be replaced, 16/11/12)	<€10 K	Exposure Lab	RF		Calibration carried out in house after every 400 hr of lamp usage	Out of Order	Internal	Trained CREST staff	Log Book	Y	N/A	11-038	N/A
Colour Spectrophotometer CE545	<€10 K	Consultancy Lab	PQ	PQ	18/6/12	30 Jun 13. Calibration validity extended to May 2014	Supplier's procedure with NIST traceability.	Optronic Colour Communications Ltd	Label on instrument. Cert. of Calibration in CREST office	Y		11-041	
Colour spectrophotometer MS2020pl (not in use, 16/11/12)	<€10 K	Consultancy Lab	PQ	PQ	22/6/11	Calibration validity extended from 18 Jun 13 to May 2014	Supplier's procedure with NIST traceability.	Optronic Colour Communications Ltd	Label and log book at instrument. Cert. of Calibration in CREST office			11-042	
Balance (2)	<€10 K	Consultancy Lab	AG	AG	21/11/13	21 Nov 14. Awaiting calibration cert. from Mason Technology	Mason Technology procedure with INAB traceability	Mason Technology	Label and log book at instrument.	Y		11-044	
300-mm Steel Rule	<€10 K	Consultancy Lab	AG		3/3/10	Mar 2015	NML procedure with traceability	NML	Label on instrument. Cert. of Calibration in CREST office			11-046	

8-m steel tape measure	<€10 K	Consultancy lab	PQ		3/3/10	BROKEN	NML procedure with traceability	NSAI	BROKEN: calibration not currently required			11-047	
E Balance												11-048	
Gallenkamp (Equipment not currently in use, 16/11/12)	<€10 K	Exposure Lab	AG		03/12/10	N/A to be disposed of	Supplier's procedure with UKAS traceability.	John Godrich	Label and log book at instrument. Cert. of Calibration in CREST office		N/A	11-050	N/A
Solartron	<€10 K	MSA	GM	GM	7/06/03	Calibrate before each use with Test Cell. Full calibration costs to be sought from Labquip.	ASTM G5; SOP No.: 11-003	PAR	Booking folder and calibration form located beside instrument.			11-054	N
Plasmatreat Openair		Consultancy Lab	MM	MM				Trained CREST staff			Y	11-056	Y
Tile cutter		MSA										11-057	Y
Reichert Jung Microscope F3	<€10 K	Consultancy Lab	AG	AG	Calibration carried out daily when in use	Calibration carried out daily when in use	In-house procedure using calibrated graticule. SOP in preparation	CREST operator	Log Book located beside instrument.	Y		11-058	

Stereomicroscope	<€10 K	Consultancy Lab	AG									11-059	
Taber Abrader		Consultancy Lab	SM	BD				CREST operator				11-060	Y
Sheen filmfuge 1110N applicator		MSA Lab	GM	GM	March 2014			Trained CREST staff				11-061	
Buelher Isomet Low speed Saw	<€10 K	Consultancy Lab	AG	AG	N/A			Trained CREST staff					
Guillotine	<€10 K	Consultancy Lab	AG	AG				Trained CREST staff					
KSV Dip Coater	<€10 K	MSA	MW	MW	Calibration required before each use	Calibration required before each use	Dipping Speed checked with calibrated ruler and stop watch.	Trained CREST staff	Log Book located beside instrument.			11-	
SVET (Equipment not currently in use, 16/11/12)	<€10 K	Sample Prep	BD		Feb 2009	N/A	SOP Due Date 1 st June 2011	Trained CREST staff	Log Book located beside instrument.		N/A	N/A	N/A
Oven (Equipment not currently in use, 16/11/12)	<€10 K	Exposure	AG		2/12/10	N/A	Supplier's procedure with UKAS traceability.	John Godrich	Label on instrument. Log Book located beside instrument.			11-	

Perkin Elmer Automatic Thermal Desorber 400	<€10 K	Sample Prep	FM	FM	N/A	Perform a calibration before each use	Calibrate with Tenax TA tubes. Quote rec. from Markes Int. Price: Certified Reference Standard tubes, BTX, 1 ug, pk 10 €1,155.00	Trained CREST staff	Log Book located beside instrument.			11-	
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TRAINING

Health and Safety training is a legal requirement specified by the Safety, Health and Welfare at Work Act, 2005. It is also Institute Policy that all employees attend such health and safety training and assessment. Please see Health and [Safety Training Policy for Staff](#).

Each employee will be made aware of emergency action plans and arrangements pertinent to their workplace as per section 11 of the 2005 Act at induction by completing the online Emergency Response Training (ERT) programme.

In addition to our statutory duty to employees, DIT seeks to provide such training as is necessary to enable the students to undertake their studies in a manner which, in so far as it is reasonably practicable, is safe and does not give rise to risks to health or expose the individual student or other persons to unacceptable levels of risk. The provision and extent of any necessary training is dependent upon the nature of the academic discipline being pursued, the experience and disposition of the students involved, their familiarity with any equipment/substances to be utilised, the environment/conditions where the activities may be discharged, and the extent to which supervision is necessary and available. Risk assessments will highlight where additional student training is required.

Training required for CREST includes:

Mandatory Training:

- Emergency Response Training (ERT)
- Manual Handling
- Emergency First-aid for all staff working in laboratories
- Legal Update for Managers (for grades V and above)

Specialist Training:

- Gas Handling (where required)
- Ionizing Radiation
- Courses on specific equipment
- Courses on use of PPE
- Dangerous Good Safety Advisor (DGSA)

A training plan is in place by CREST detailing all mandatory and specialist training required. It is a database of all team members and their compliance with training.

EMERGENCY PLANNING AND RESPONSE

SERIOUS INCIDENT/EMERGENCY

- Dial 112/999 (You may need to dial “0” for an outside line)
- Contact Health & Safety Officer - 086 3891080

REQUIRES FIRST-AID

- Seek CREST first-aider – see Contacts page.
- Injured unwell staff/students:

Occupational Health Officers

Yvonne McArdle

087 9809135

- Injured/Unwell Students:

Student Health Centres

Southside	01 402 3051
Northside	01 402 3614

If serious/after 5pm/in doubt, go directly to local A & E/local GP

REQUIRES FURTHER ATTENTION

- Staff members should attend their local GP; Students should attend the Student Health Centre
- Structural safety matters - Should be referred to the local Buildings Maintenance Manager
- Operational safety matters – Should be documented on a Hazard Report Form and sent to the Health & Safety Office (www.dit.ie/safework)

FIRE & EVACUATION
CREST STAFF

INSTRUCTIONS ON DISCOVERING A FIRE (all staff, students, visitors, contractors/service providers etc.)

- Activate the nearest fire alarm point
- Leave the building using the nearest exit route
- Disperse from the building and move away to place of safety
- Do not use the lift
- Do not re-enter the building until the “all clear” has been given

INSTRUCTIONS ON HEARING THE EVACUATION ALARM OR OTHER WARNING (all staff, students, visitors, contractors/service providers, first-aiders etc.)

Objectives:

To outline actions to be taken by CREST staff in the event of an Alarm Activation

Duties:

On hearing an alarm activation or other warning:

- Instruct students and staff to leave the FOCAS Institute (CREST is mainly located in the basement)
- All visitors should be escorted to safety by the person they are visiting
- Anyone in common areas or moving between areas, should immediately join the lines of people exiting
- Shut down equipment if safe to do so and time permits
- Close windows and doors to confine smoke/fire
- “Sweep search” the area (laboratories, offices, sanitary facilities, storage areas etc.), evacuate the building* immediately by the nearest available exit. Marshals should then leave immediately via the nearest escape route
- If required, assist any individuals to evacuate the area

- Form a single file on both sides of the corridor or stairway, leaving the centre passageway clear
- Do not delay or stop to collect personal belongings
- Do not use the lift
- If heavy smoke present, try to find another exit or crouch low to the floor
- All doors should be closed (not locked) by the last person in the line
- Report to your Assembly Points: **Camden Row**
- All evacuation marshals/sweepers, Building Maintenance personnel, Heads of CREST, first-aiders should assemble at the **assembly points** to check in, reporting to the Incident Controller details of any casualties or people needing assistance with evacuation. This information is then given by the Incident Controller to the Emergency Services.
- Confirm to the Incident Controller that the area has been cleared and report details of any casualties or people needing assistance with evacuation to the Incident Controller
- Do not return to the building until instructed to do so by the Incident Controller

* Separate personal emergency egress plans (PEEP) have been prepared for people with disabilities

YOU SHOULD FAMILIARISE YOURSELF WITH THE LOCATIONS OF THE FOLLOWING:

- Escape routes
- Fire alarm call points
- Fire extinguishers and blankets
- Fire assembly points

The Assembly points for DIT, Kevin Street are:

1. Camden Row



Your Incident Controller is: FOCAS Institute Manager or another staff member

Evacuation Marshals include:

- Brendan Duffy
- Swarna Jaiswal

CREST will ensure that sufficient marshals are appointed on an ongoing basis to provide an effective service.

General Rule of Thumb – all staff should act as “sweepers” in the event of an emergency, checking laboratories, offices, sanitary facilities, storage areas etc. as they exit to ensure that as they exit everywhere has been cleared.

YOU SHOULD NOT PUT YOURSELF IN DANGER AT ANY TIME

FIRST-AID

- An emergency first-aid kit and automatic external defibrillator (AED) is available at the front desk/reception area.
- A list of Institute Staff who have completed training in first-aid/AED is available on the [health and safety website](#)

Trained first-aiders include:

- Swarna Jaiswal
- Mohamed Oubaha
- Patrick Kene
- Annaik Genson
- Garrett Melia
- Craig Hicks
- Killian Barton
- Felicia Mutuma
- Ensar Mulahmetovic

First-aid kits are located:

- Laboratory MSA
- Consultancy lab
- Exposure lab
- Sample Perpetration lab

Please report any used items to the designated person in charge who is responsible for monitoring the contents and ensuring their replacement.

Further Treatment / Incident Report Forms

- Staff may refer students to the Student Health Centre in DIT, Aungier Street at 01 402 3051 or contact the Emergency Services on 112 / 0999 if an incident is urgent
- Incident Report forms are available from the Front desk/Reception. When completed and signed the top white copy should be sent the DIT Health & Safety Officer
- An Occupational Health Officer (Yvonne McArdle) is available at 087 9809135 weekdays 9:00am – 5:00 pm to deal with the occupational health, safety and welfare needs of all staff and students and to provide a backup first-aid service

INCIDENT REPORTING AND INVESTIGATION

The Institute has a statutory duty to record all incidents and report certain types of incidents and dangerous occurrences to the Health and Safety Authority (HSA). Therefore all incidents resulting in personal injury, damage to property, dangerous occurrences or near miss e.g. must be reported immediately to your Manager/Supervisor.

The incident report form must be forwarded to the Health & Safety Officer within 24 hours of the incident occurring or as soon as possible. Incident report forms are available at the front desk/reception area.

HAZARD REPORTING

DIT recognises the part that its staff/students/visitors and contractors/service providers have to play in the reporting of hazards in the workplace. There is a report form to formally identify and report hazards. If the hazard is a structural issue, it should be reported immediately to the local Building Maintenance Manager and if it is an operational safety issue, it should be reported to local management using the Institute's Hazard Report Form available on the [health and safety website](#).

RADIATION SAFETY

In its use of radiation sources CREST operates XRD according to the procedures approved by the Radiation Protection Advisory Committee. Copies of the Radiation Protection Manual and Risk assessment are available in all of the laboratories in which radiation sources may be used and is available on CREST's web-based staff collaborative area and FOCAS health and safety officer. Detailed procedures for the management and checking of radiation sources are in place.

MANAGEMENT OF CONTRACTORS/SERVICE PROVIDERS

All work undertaken by outside contractors/service providers on behalf of CREST must be carried out under a Buildings Office Permit to Work.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

It is the policy of DIT to eliminate all hazards where reasonably practicable. DIT will assess what PPE appropriate to the task/work environment is required only as a last resort when further risk reduction is not feasible.

All PPE and safety equipment purchased by CREST must be of approved standards and comply with relevant EC Directives regarding design and manufacture. Defects shall be reported to Managers/Supervisors.

The various areas where PPE must be worn are outlined in the departmental risk assessments. This is further complemented with signage. PPE shall be provided and worn in designated areas and whilst carrying out specific tasks, based on the risk assessments.

All PPE must be appropriate for the risks involved without it leading to increased risk. It should be chosen based on assessment and in consultation with staff members. The PPE should be used only for the purpose specified and where it is necessary to wear simultaneously more than one item of PPE, they must be compatible with each other and continue to be effective against the risks involved. Staff should report immediately when the PPE is faulty or defective or if they have any medical condition that may affect the correct use of the PPE.

PPE should be of a type suitable for the conditions in the workplace and take account of the user's state of health. It is in principle intended for one's personal use only, however if it is necessary for an item of PPE to be worn or used by more than one person, measures should be taken to ensure that it does not create any health or hygiene problems for the users. The supply, issue and record of all PPE is the responsibility of Supervisors. Employees and students must be informed of all risks they are being protected from, instructed on the use of the PPE and given adequate information, training and demonstration in the wearing of such equipment and the level of protection afforded by its use. Every person provided with PPE must take reasonable care of such equipment and must make proper use of it where there is a foreseeable risk of injury and where they have been instructed to do so. They must also ensure that it is returned to storage subsequent to use. Supervision and monitoring are required to ensure PPE is used/worn.

Staff shall inform any person in the area including contractors/service providers, students and visitors of the statutory and local policies in place with regard to PPE.

PPE for CREST includes:

- Safety glasses (mandatory at all times)
- Laboratory coat (when working with chemicals or in a chemistry laboratory)
- Gloves (when working with chemicals or in a chemistry laboratory)

It is the responsibility of individual staff members to select appropriate PPE and ensure that students wear it. Contaminated PPE should remain in the work area and not be worn into any "clean" areas such as offices or canteen. PPE that is contaminated must be discarded as infectious waste or disinfected prior to routine laundering.

Gloves

The hazards of the materials to be used are evaluated prior to selecting gloves. Latex or nitrile examination gloves are appropriate for most routine work with biohazards. These gloves are single-use only; they cannot be washed and reused. Gloves must be checked for holes or tears.

Latex Allergy Minimization

Latex allergy can result from repeated exposure to proteins in natural rubber latex. Exposure can be due to skin contact with a latex-containing item or inhalation of the proteins. Reactions can range from skin rash to anaphylaxis and shock. Non-latex gloves should be used for activities that are not likely to involve contact with infectious materials. Powder-free gloves with reduced protein content should be used for other activities.

Respiratory Protection

Respiratory protection may be necessary if aerosol generation cannot be prevented or contained by other means.

Eye and Face Protection

Safety glasses must have side shields. Chemical splash goggles may be necessary if the work involves chemicals. A face shield may be necessary in addition to the safety glasses or goggles if the potential for splashing, spraying, or aerosol generation exists.

Laboratory Clothing

Shorts, sandals, and open-toed shoes should not be worn in the laboratory. Howie-style laboratory coats must be worn, buttoned up, to protect street clothing from potential contamination. Lab coat sleeves should be long enough to enable the wearer to overlap the glove cuffs with the sleeves.

ERGONOMICS

All new equipment and machines, tools, work methods, work procedures and work stations should be assessed for ergonomic hazards prior to being brought into use. The Health & Safety Officer should be informed of the risk assessment process and will advise of competent people to assist with the risk assessment.

Staff should consider ergonomic standards when designing new workstations and layout of new offices.

It is the responsibility of the Head of CREST to ensure that all information on ergonomic controls is communicated to employees and students via circulars, team briefings or other means. He should also ensure that all problems identified are addressed and brought to the attention of the Health & Safety Officer.

WELFARE PROVISIONS

In accordance with legislation, Dublin Institute of Technology is committed to providing welfare facilities which are available to all staff which include the following:

- ✓ Adequate and suitable sanitary and washing and drying facilities with hot and cold running water maintained in a clean and hygienic condition
 - ✓ Adequate number of lavatories and washbasins with hot and cold running water
 - ✓ An adequate supply of potable drinking water at suitable points conveniently accessible to all employees, tested by the Buildings Office
 - ✓ Suitable facilities for sitting/other ergonomic support, in the case where work can be done in a seated position
 - ✓ Suitable and adequate facilities for boiling water and taking meals or reasonable access to other suitable and adequate facilities are available in the staff room on the ground floor in FOCAS. Facilities are also available in DIT, Kevin Street (canteen, Annexe and in the staffroom, 4th floor, main building)
 - ✓ Staff room on the ground floor contains a kettle, microwave and dishwasher, and a fire blanket and CO₂ fire extinguisher are also available
 - ✓ Kevin Street: Canteen: Ground floor: Annexe & Staff room: 4th floor are also available
 - ✓ Easily accessible rest rooms/areas with seats with backs
 - ✓ Adequate provision for drying wet or damp work clothes
 - ✓ Adequate ventilation, temperature and lighting
 - ✓ Fire detection and fire fighting equipment
 - ✓ Emergency routes and exits
 - ✓ Pedestrian management systems
 - ✓ Clean and well maintained interior walls, floors and traffic routes
 - ✓ Rest facilities for pregnant ladies or breastfeeding mothers are available in Room 225, Kevin Street
-
- Everyone is obliged to care for these facilities and must not misuse them. All welfare provisions should be maintained in a clean safe condition
 - Arrangements for regular cleaning of premises and removal of waste should be made by the local Building Maintenance Manager. Cleaning and waste disposal are managed by Noonan Cleaners. Arrangements for cleaning and waste disposal is outlined in the risk assessments below
 - Drinking water is available to all staff in the staffroom on the ground floor in FOCAS

SENSITIVE WORK GROUPS

Protection of Children and Young Persons

In cases where children must be present on Institute premises and therefore affected by our acts/omissions, sufficient notification must be given to the Health & Safety Office by the DIT host representative, of the situation, so that an appropriate risk assessment may be carried out. When on DIT property, the parents/guardians/host representative charged with responsibility for bringing the child onsite, must be responsible for that child and ensure that at all times they are supervised and protected from activities, processes, equipment, machinery, agents etc.

Ask CREST for details for any circumstances where this applies

- **Transition year students**

Please ensure that all staff are familiar with the [DIT Child Protection Policy](#).

Pregnant Post-Natal and Breastfeeding Employees/Students

The *Safety, Health and Welfare at Work (General Application) Regulations 2007*, places a duty on employers to assess the risks to determine any possible effects on new/expectant mothers resulting from any activity at the place of work.

- Each risk assessment will identify hazards in the workplace that could pose a health and safety risk to new and expectant mothers
- Where the assessment reveals a risk, then preventive or protective measures will be taken.
- Pregnant employees/students should advise the Health & Safety Office of their condition as soon as they are aware they are pregnant so that a confidential pregnancy risk assessment may be carried out
- On returning to work/college any new mothers who are breastfeeding and require facilities should contact the Health & Safety Office

LONE AND OUT OF HOURS ACCESS

Lone working/out of hours access takes place in CREST. This is controlled as per the FOCAS Institute policy. Access to the building is controlled via swipe access and all CREST team members have access cards. All users of the building are instructed to ask the intentions of others trying to access the building. CREST team members sign in with details of where they are working in the building. A buddy system is in place where team members must coordinate work times to ensure there are 2 people present, especially outside of normal working hours.

WORK PLACEMENT

Work placement fact sheets are available for all host employers/organisations, DIT students and DIT mentors, and must be studied before arranging and undertaking any work placement. CREST team members sometimes work in other locations and companies e.g. DCU, Galco etc. to access specialist equipment that is not available in CREST in the FOCAS Institute.

Interns visit CREST. They are fully inducted by CREST. List.

Interns	Risk assessment (Y/N)	Training	Induction day of arrival Y/N
Luana.martins	Y	Manual handling course (11/06/2014) Emergency response training (12/06/2014) Emergency first-aid (13/06/2014)	Y
Simon Munro	Y	Ongoing	Y
Zélie Tournoud	Y	Ongoing	Y
Romain Nicolas	Y	Ongoing	Y
Florentinromain	Y	Ongoing	Y

TRIPS/TRAVEL

Staff must complete a risk assessment prior to trips. All trips and travel proposals must have a risk assessment completed prior to the event.

STAFF/STUDENTS WITH DISABILITIES

Specific risk assessments will be completed to ensure that the health and safety needs of staff and students with permanent/temporary disabilities are taken into account. Preventative and proactive measures will be put in place following the risk assessment if specific hazards are identified. Personal emergency egress plans (PEEPs) will also be prepared if required. The Disability Liaison Officer will provide specialist and competent advice and liaise with the Health & Safety Officer, Occupational Health Officers, College Manager and Building Maintenance Manager. The onus is on visitors with a disability to notify staff at the front desk, who will assist in evacuation if required.

Please ensure all staff and students are familiar with the procedure and are referred to relevant services where necessary.

HEALTH SURVEILLANCE

Risk assessments will determine if health surveillance is required. Health Surveillance is made available to all staff appropriate to the health and safety risks present and facilitated by the Health & Safety Office. In certain circumstances, staff and students may be referred to our external

Occupational Health Physician for a health assessment in relation to their work/studies to ensure that we can put in place any additional corrective action if required.

Eye tests are available for regular visual display unit users at the National Optometry Centre. Please familiarise yourself with the eye test policy which is available on the [health and safety website](#).

WORKPLACE DRUGS, INTOXICANTS AND ALCOHOL

An employee/student must 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 or that of any other person. Contraventions will be dealt with as per DIT disciplinary procedures.

DIGNITY AT WORK ANTI BULLYING & HARASSMENT POLICY AND PROCEDURES

The Institute's Dignity at Work Anti Bullying & Harassment Policy and Procedures deals with complaints against members of staff in the workplace which also includes work associated events such as meetings, conferences and work related social events, whether on the premises or off site. Bullying or harassment of staff/students will not be tolerated. Please ensure that all staff are familiar with the relevant [policy/procedure](#).

STRESS

The risk assessment will identify any areas where stress is a hazard and controls will be implemented to eliminate this hazard. The HR department should be consulted immediately if an issue regarding stress is highlighted. An Employee Assistance Programme (EAP) is available to all staff. Students should liaise with their tutors in relation to issues regarding stress. Tutors are appointed for groups of students. Students may also seek assistance from the Student Health Centre and Student Counselling Service.

AUDIT, REVIEW AND COMMUNICATION

CREST ensures that periodic health and safety audits are completed and a review of all Safety Statements and documentation takes place. This will be approved by DIT SLT Health and Safety Sub-Committee. All changes will be communicated to all staff, students, visitors and contractors/service providers. The most recent revision of all Safety Statements will be available on the DIT safety website and from CREST Management.

DOCUMENT CONTROL

This document is a controlled document and as such any updates, review and distribution will be in accordance with DIT's standards for such documents. Only controlled copies will be updated when required.

The Head of CREST will issue new documents after appropriate consultation and agreement with relevant parties.

HAZARD IDENTIFICATION, RISK ASSESSMENT AND CONTROL MEASURES

It is the policy of the Institute to identify hazards in the workplace, assess the risk to safety and health and control these risks as far as is reasonably practicable.

The Parent Safety Statement outlines the generic hazards, which have been identified and the control measures that are in place.

It is incumbent on those responsible for managing their areas of work, at all levels, not merely to observe the arrangements described in the Parent Safety Statement, but to assess their applicability within their area of authority and where necessary to refine and extend them to deal with particular local situations. The management of the Dublin Institute of Technology is committed to ongoing identification of hazards, assessment of the appropriate risks and the introduction of controls to deal with them. Management at all levels have a responsibility to apply this principle within their area of authority.

Staff are encouraged to become involved and participate in safety, health & welfare issues. In particular, they are encouraged to identify any potential hazards, which may exist, and to ensure that a risk assessment is carried out.

Ongoing hazard inspections will be carried out periodically to ensure that the information is updated, controls are adequate and where necessary the risks are reassessed.

A “**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 staff, students, visitors, contractors/service providers in DIT”. Hazards may be classified as:

- Physical
- Chemical
- Biological
- Operational
- Human Factors

“**Risk**” is a measure of the probability of the event occurring and the severity and extent of the injury, ill health or damage it may cause if it did occur.

Risks may be classified as:

- High
- Medium
- Low

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.

The classification of hazards should be used to develop the priority of control measures, remedial actions, and the allocation of resources. As a general rule, the control measures will seek to eliminate any risk classified as high and reduce the potential of risks classified as medium or low.

Risk control measures are a combination of:

Elimination	Where the hazard is removed
Substitution	Where the hazard is exchanged for one of lesser classification
Isolation	Where the hazard is contained (e.g. Enclosures, guards etc.)
Engineering	Where common systems are used to protect all exposed to risk (e.g. Fire alarms, ventilation systems etc.)
Procedure	Where procedural controls are used. This will include procedures such as Standard Operating Procedures and training and the provision of information may apply to any and all of the above control measures
Personal Protection	Whereby the above means, the risk cannot be reasonably be reduced further, but an unacceptable level of risk remains, the team members are individually protected from the risk

Risk Assessments for CREST

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Fire Emergency Response & Evacuation Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Staff unfamiliar with evacuation procedure • Lack of evacuation drills • Use of naked flames • Improper storage of flammable or combustible materials • Smoking in undesignated areas • Faulty electrics • Inadequate emergency equipment • Misuse of equipment 	<ul style="list-style-type: none"> • Staff trained in ERT • Sufficient firefighting equipment available (break glass units, extinguishers, fire blanket) • Sufficient fire extinguishers in place • Firefighting equipment and detection systems maintained and tested • Evacuation signage in place • Emergency and first-aid procedures posted • Good housekeeping standards maintained • Several means of escape present and known to occupants • Evacuation procedure practiced each semester • Assembly point known to occupants 	<ul style="list-style-type: none"> • Remove any material that blocks vision panels on doors • Maintain current controls 	With current controls: L With Actions applied: L	CREST Team Members DIT Buildings Office	Ongoing

			<ul style="list-style-type: none"> • Occupants escort visitors out • All exits are clear and free from obstructions • Staff members act as evacuation marshals • No smoking policy in place • Scheduled maintenance of buildings services (heating, electricity, ventilation etc.) takes place • Hot work permit system in place where needed • Compliance with building regulations • Vision panels on doors where required • Fire blankets available in each lab • Signage on lab doors re: unauthorised access • See chemical storage • Fire blanket and CO₂ fire extinguisher in staff room ground floor 				
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PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Manual Handling Examples: Moving large equipment, hazardous materials, substances etc. Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Manual Handling-related injuries, e.g. back injury • Slips, trips, falls 	<ul style="list-style-type: none"> • All staff compliant with and adhere to mandatory manual handling training • Trolleys, stools available for staff • Manual handling risk assessments available to all staff, contact local OHO • See Gas Cylinders • PPE used/worn • Good housekeeping • Suitable environment • Implement team lifting were required • Adequate lighting maintained • Assistance from colleagues - team lifting • Report issues to Line manager • Items not stored above shoulder height 	<ul style="list-style-type: none"> • Refresher training to be carried out where necessary • Implement manual handling training 	With current controls: L With Actions applied: L	CREST Team Members	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Work Equipment, Machinery & Tools	<ul style="list-style-type: none"> • See specific equipment risk assessment and Table 1. • Noise • Vibration • Entanglement/ crushing • Electrics • Fumes/ dust • Contact with moving parts 	<ul style="list-style-type: none"> • Guards in place • SOP; use and maintenance • Training given and records kept • Service and maintenance • Signage in place • Supervision • Visual check before use • Report defects to line manager • Emergency stop • PPE worn/used • Follow manufacturer's instructions • Shut down after use and end of day • CE mark • Damaged equipment marked and taken out of service 	<ul style="list-style-type: none"> • Maintain current controls 	<p>With current controls: L</p> <p>With Actions applied: L</p>	CREST Team Members	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Portable Appliances & Handheld Equipment e.g. Laptops	<ul style="list-style-type: none"> Entanglement/ crushing Electrics Fumes/dust 	<ul style="list-style-type: none"> Visual check before use Report defects to Line Manager CE mark Shut down after use and end of day Follow manufacturer's instructions 	<ul style="list-style-type: none"> Maintain current controls 	With current controls: L With Actions applied: L	CREST Team Members	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Noise Examples: <ul style="list-style-type: none"> • Tools & equipment • Compressed Air • Paint Spraying • Large scale microwave Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Hearing loss / damage • Disruption/ distraction • Interference with communications and warning signals • Fatigue • Tinnitus 	<ul style="list-style-type: none"> • Noise <80dB • Monitoring can be carried out by the DIT Health & Safety Office where need arises • Signage in place where required • Health surveillance carried out where required • Maintenance of equipment at regular period. • Information and training provided to staff and students • Follow manufacturer's instructions • Assessment of noise levels carried out • Provision of hearing protection • Supervision to ensure wearing of hearing protection • Information and training 	<ul style="list-style-type: none"> • Maintain current controls • Introduce engineering and administrative controls to control noise or reduce exposure e.g. enclose the source of noise, minimise time spent in noisy areas, job rotation etc. where deemed necessary • Noise monitoring available from the Health & Safety Office on request 	With current controls: L With Actions applied: L	CREST Team Members	Ongoing

			<p>with regard to noise and use of hearing protection</p> <ul style="list-style-type: none">• Signs in place re: noise levels and use of hearing protection• All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed• Trained first-aiders and a first-aid kit available• Students receive safety induction from supervisors.• Staff are adequately trained and are competent in the use of the equipment				
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PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Structural: Floors Walls Ceilings Doors Fixed Shelving Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Personal Injury • Slips, Trips and Falls • Collapse • Trapping 	<ul style="list-style-type: none"> • Building appears to be structurally sound • Defects and hazards are reported to the Buildings Office through online hazard reporting • Doors open and close safely • Vision panels in place on doors where required 	<ul style="list-style-type: none"> • Remove any material that blocks vision panels on doors • Contact Buildings Office if problems arise 	With current controls: L With Actions applied: L	CREST Team Members DIT Buildings Office	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Slips, Trips & Falls Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Slips, trips and falls • Uneven surfaces • Wet floor conditions • Raised obstacles 	<ul style="list-style-type: none"> • All routes kept clear and unobstructed • See Noonan risk assessment • Use of warning signage where appropriate • Hazards are reported • Good cable management • Changes in floor levels identified and marked • Door mats provided at entrance (main entrance) • Handrail on steps/stairs • Stair nosing fitted with anti slip finish • Adequate lighting • Good housekeeping • SOP for spillages 	<ul style="list-style-type: none"> • Maintain current controls • Buildings Office to ensure upkeep and maintenance of internal and external access and egress routes e.g. walkways, paths, driveways, floors, corridors, steps and stairs 	With current controls: L With Actions applied: L	CREST Team Members DIT Buildings Office	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Access and Egress Opening Times: See DIT website Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Security threats • Threats from public • Violence / Assault • Unwanted visitors • Unauthorised access 	<ul style="list-style-type: none"> • Lone working/out of hours access takes place in CREST. This is controlled as per the FOCAS Institute policy • Access to the building is controlled via swipe access and all CREST team members have access cards • All users of the building are instructed to ask the intentions of others trying to access the building. • CREST team members sign in with details of where they are working in the building • A buddy system is in place where team members must coordinate work times to ensure there are 2 people present, especially outside of normal working hours • CCTV in place 	<ul style="list-style-type: none"> • Report suspicious activity to Porters or Gardaí immediately • Ensure XRD lab are locked/have access key to FOCAS and DIT building manager when required. • Ensure clean the place after use and remove all clutter. • 	With current controls: L With Actions applied: L	CREST Team Members DIT Buildings Office	Ongoing

			<ul style="list-style-type: none"> • Suspicious activity reported to Gardaí or Porters in Kevin Street • ERT covers procedure in the event of suspicious activity • Good housekeeping <p>Laboratories</p> <ul style="list-style-type: none"> • Signage present on lab doors regarding unauthorised access • Appropriate signage on lab doors where hazardous substances are in use/stored 				
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PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Photocopiers & Printers Shared printers and photocopiers available in: <ul style="list-style-type: none"> • Main Office (Dell): x1 • Ground floor & 1st Floor: x2 MFP Who is harmed: <ul style="list-style-type: none"> • Staff members • Visitors • Contractors • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Changing toner etc.: chemical contact • Clearing jams: burns • Not wearing gloves • Not turning off electrical supply • Incorrect disposal • Personal injury • Lack of information / training 	<ul style="list-style-type: none"> • Toner / print cartridges changed by staff members who wash hands after use • Gloves worn while changing toner • Power turned off before clearing jams • Disposal as per manufacturer's directions • Scheduled maintenance by DIT IS • Correct disposal of waste cartridges • Follow manufacturer's instructions 	<ul style="list-style-type: none"> • Maintain standards • Ensure gloves are supplied and worn 	With current controls: L With Actions applied: L	CREST Team Members DIT IS	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Ergonomics: Office / Workstation Who is harmed: <ul style="list-style-type: none"> • Staff members • Visitors • Contractors • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • MSD's • Upper limb disorders • Poor posture • Back problems • Fatigue • Slips, trips and falls 	<ul style="list-style-type: none"> • Online eLearning programme available • Workstation risk assessments and information and training available from the Health & Safety Office on request • Contact OHO if risk assessments are required • Eye tests available to staff • Good housekeeping • Good cable management • Adequate services (heating, lighting ventilation) in place • Follow manufacturer's instructions when using equipment 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members DIT Health & Safety Office	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Mechanical Lifting Systems None present	• N/A	• N/A	• N/A	• N/A	• N/A	• N/A

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Vehicles/ deliveries on site Deliveries include: <ul style="list-style-type: none"> • BOC • Liquid nitrogen • Chemicals • Couriers • GRN • Samples Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Injury to person/ struck by vehicle • Poor access and egress 	<ul style="list-style-type: none"> • Couriers come straight to CREST, FOCAS • GRN go through Goods Inwards, Kevin Street • Samples are sent straight to CREST and signed in by any team member • Deliveries handled by Goods Inwards Kevin St. • Designated area for loading and unloading goods present on Kevin Street site • Safe access and egress maintained • Designated walk ways • Defects reported to DIT Buildings Office • Adequate lighting in place • Hi Vis clothing worn where required 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members DIT Buildings Office	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	<p>Hot Surfaces / Liquids / Solids</p> <p>E.g. <u>Hot plates</u>; Cups of hot beverages</p> <p>Who is harmed:</p> <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Contact burns • Scalds • Spillage • Exposure to hazardous chemicals and substances 	<ul style="list-style-type: none"> • Lids available for cups • Spillages cleaned up immediately • SOP in place for spillages: Noonan • Wet floor signage available for spillages • CREST SOP available for Spillages 	<ul style="list-style-type: none"> • Maintain standards 	<p>With current controls: L</p> <p>With Actions applied: L</p>	<p>CREST Team Members</p> <p>Noonan Cleaners</p>	<p>Ongoing</p>

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Pressure Systems Example <ul style="list-style-type: none"> • Microwaves Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Contact burn • Personal injury • Explosion • Spillage • Release of steam/ fluid / air • Explosion of solvents 	<ul style="list-style-type: none"> • SOP in place • Service and maintenance • Training provided to staff • Defects are reported • PPE worn/used • First-aid kit available • Signage in place where required • Follow manufacturer's instructions • Certificate of test examination • Risk assessment (place near the instrument and stored in the CREST I drive) 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members DIT Buildings Office	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Radiation Ionizing radiation: XRD Licence Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Death • Brain damage • Sterility • Skin burn/ blistering 	<ul style="list-style-type: none"> • Health surveillance • Personal monitoring • Signage • Restricted access • Storage; sealed designated area • SOP for use and handling • Specialised risk assessment place in near the equipment and stored in the CREST I drive. • Training and information • Radon testing completed, results below the threshold values • Radiation Protection Officer (RPO) in place • Competent waste contractor engaged 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members RPO	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Vibration <ul style="list-style-type: none"> • Hand-held power tools • Floor/bench mounted machinery and equipment 	<ul style="list-style-type: none"> • Damage to nerves and blood supply • Hand Arm vibration exposure “white finger” • Carpal tunnel syndrome • Whole Body vibration exposure 	<ul style="list-style-type: none"> • Equipment used and maintained in accordance with manufacturer’s instructions • Task rotation used to minimise exposure • Regular breaks are taken from use • Equipment is mounted and not hand-held where possible • Gloves provided and worn • Information and training provided • All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed • Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory • Students and users are instructed and supervised • Students receive safety induction from supervisors. • Staff are adequately trained and are competent in the use of the equipment • Hand-washing facilities available in the laboratory • Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately 	<ul style="list-style-type: none"> • Source information from manufacturer on vibration exposure levels and maximum times for use • Implement engineering controls to reduce vibration levels e.g. dampening materials 	With current controls: L With Actions applied: L	CREST Team Members	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	<p>Services: Heating</p> <p>Gas fired central heating in place throughout FOCAS controlled through the boiler room in the basement</p> <p>Who is harmed:</p> <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Environment too hot or cold • Electrical hazards • Misuse of portable heaters • Leaks • Fire • Burns • Carbon monoxide poisoning 	<ul style="list-style-type: none"> • Electrics appear to be up to standard • Cables neatly positioned • Contact Buildings Office if problems or defects arise • Service and maintenance carried out by competent person • Combustible materials kept away from heat source • Heat source kept clear and free from obstruction • Environmental monitoring from the Health & Safety Office on request • Adequate ventilation by openable windows and AC system • Fire detection systems in place 	<ul style="list-style-type: none"> • Maintain standards 	<p>With current controls: L</p> <p>With Actions applied: L</p>	<p>CREST Team Members</p> <p>DIT Buildings Office</p>	<p>Ongoing</p>

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Lighting Fluorescent lighting throughout FOCAS Institute Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Inadequate lighting • Glare • Slips, trips , falls 	<ul style="list-style-type: none"> • Light switches easily accessible (height) • Adequate lighting in place • Defects are reported to the Buildings Office • Protective coverings in place where required • Environmental monitoring available from the Health & Safety Office on request • Service and maintenance carried out by competent person 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members DIT Buildings Office	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Ventilation and temperature Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Environment too hot or cold • Inadequate ventilation • Falls from heights from windows 	<ul style="list-style-type: none"> • All windows openable • Blinds in place and in working order where required • Defects are reported to the Buildings Office • Step ladder available for access where required • Service and maintenance of ventilation system carried out by competent person • Office temperature of at least 17.5°C (after one hour of work) • Environmental monitoring from the Health & Safety Office on request 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members DIT Buildings Office	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Electricity Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Electric shock • Electrocution • Ignition source • Fire • Explosion • Death • Electrical arcing • Damaged electrical equipment • Use of faulty equipment • Contact with live parts • Unmarked distribution boards • Inadequate electrical installations 	<ul style="list-style-type: none"> • Sufficient numbers of electrical sockets • Electric leads not trailing and good cable management • Sockets are not overloaded • Competent person to carry out repairs / works • All works servicing and testing is carried out as per regulations • Shut down when not in use and end of day • Contact Buildings Office if problems arise • Adequate protection for circuit boards, distribution boards etc. • Report defects, take equipment out of use • Good housekeeping 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members DIT Buildings Office	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Asbestos Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Exposure to airborne fibres and subsequent illnesses 	<ul style="list-style-type: none"> • Buildings Office take advice from appropriate consultants to ensure asbestos is made safe if suspected • DIT will review locations where there is asbestos insitu 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	DIT Buildings Office	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Confined Spaces	• N/A	• N/A	• N/A	• N/A	• N/A	• N/A

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Lasers Details: <ul style="list-style-type: none"> • FTIR • Ramen Lasers Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Skin injury • Eye injury • Unauthorised access 	<ul style="list-style-type: none"> • Risk assessment completed • SOP for use • Laser beam path enclosed • Do not look directly at the beam • Beams are horizontal • Information and training • Signage on door • Log book completed and records available • Eye protection, PPE list • Hand and arm protection • Optical components securely clamped • Stray laser beams located and terminated • No personal jewellery 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	FOCAS Technical Officer	Ongoing

PHYSICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Construction / Maintenance Work Examples: <ul style="list-style-type: none"> Noonan Cleaners Building contractors Ricoh Who is harmed: <ul style="list-style-type: none"> Staff members Students Visitors Contractors Young persons Pregnant women Postgraduates People with disabilities 	<ul style="list-style-type: none"> Unfamiliar with DIT buildings and safety procedures Injury to contractors, staff, students, members of the public 	<ul style="list-style-type: none"> Buildings Office control all contractors who also send communication to staff regarding works Front desk/Reception is manned at all times by a Porter Sign in required Compliance with DIT code of practice for contractors Signage in place eLearning completed before contractors arrive on DIT premises DIT Contractor safety badge issued and worn Risk assessment and method statements completed and submitted to the Buildings Office Good housekeeping standards maintained Areas of works cordoned off 	<ul style="list-style-type: none"> Maintain standards 	With current controls: L With Actions applied: L	Noonan Cleaners Building Contractors Ricoh	Ongoing

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Work Activities / Processes Please see Specific Hazards Risk Assessment						

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Housekeeping Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Slips, trips and falls • Increased fire load • Falling objects • Collisions • Spillages 	<ul style="list-style-type: none"> • Retort stands not stored on floor • Equipment stored on suitable shelving/in suitable cabinets / containers etc. • Fire load kept to a minimum • All routes kept clear and unobstructed • Wet floor signs in place when required • Spillages cleaned up immediately with spill kit • Adequate lighting in place • Adequate waste disposal • Designated chemical stores and equipment stores in place • See controls for slips, trips & falls also • Spillages SOP in place • See Spillages also 	<ul style="list-style-type: none"> • Maintain standards 	<p>With current controls: L</p> <p>With Actions applied: L</p>	CREST Staff and Students	Ongoing

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Cleaning Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Lack of cleanliness or hygiene • Manual handling injury • Exposure to hazardous substances • Spillages: slips, trips and falls • Lack of/inappropriate PPE 	<ul style="list-style-type: none"> • Labs are cleaned daily • Daily cleaning schedule • Monthly lab cleaning take place by all staff and students • Most cleaning takes place when building is unoccupied: See Noonan risk assessment • Materials and containers adequately labelled • Training and information (chemicals) • Wet floor signage in place when required • Adequate and designated storage area for cleaning materials and equipment • Use of appropriate cleaning equipment • Report defects and hazards • Manual handling training completed; SOPs in place 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members Noonan Cleaners	Ongoing

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Waste Disposal & Removal Carried out by Noonan Cleaners usually during cleaning Please see Chemical & Clinical Waste Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Waste accumulation • Fire • Sharps injuries • Exposure to bodily fluids • Manual handling injury • Exposure to hazardous substances • Spillages: slips, trips and falls • Lack of/inappropriate PPE 	<ul style="list-style-type: none"> • Recycling bins available: paper, shredding etc. • See Noonan SOP & risk assessment (Edel) • General waste segregated by Thorntons • Waste removed on a regular basis • Done by Noonan Cleaners • Instruction and training given to operators • Labelling of waste where necessary • Designate waste storage area present • Manual handling training completed/implemented • Equipment for transport of waste e.g. trolleys • See Chemical & Clinical Waste • Safety Handling of Sharps & Needle sticks policy (Appendix: SOP: 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members Noonan Cleaners	Ongoing

			procedure in the event of a needle stick/ sharps Injuries)				
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OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Signage and Documentation Particular Hazards include: Chemicals (Appendix) Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Lack of knowledge regarding safety procedures 	<ul style="list-style-type: none"> • Signage in place on lab doors regarding chemical use and 'No entry' where relevant • Relevant signage posted as per hazards • Emergency contact numbers at Front desk/Reception • Safety booklets and safety wallet cards available • Defects reported to Buildings Office / Health & Safety Office <p><i>Signage in place includes:</i></p> <ul style="list-style-type: none"> • Emergency Exit • Emergency First-aid • Evacuation plan • Safety Notice points • Fire Action Notice Points • No Smoking 	<ul style="list-style-type: none"> • Maintain standards 	<p>With current controls: L</p> <p>With Actions applied: L</p>	CREST Team Members	Ongoing

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Incidents Hazard Reporting First-aid Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Lack of first-aid supplies • Lack of trained first-aiders • Lack of knowledge of procedure in the event of an incident • No reporting of incident(s) • No reporting of hazards 	Each lab has: <ul style="list-style-type: none"> • First-aid kit • Staff trained in first-aid • Emergency numbers • Emergency first-aid procedure posted Front desk/Reception: <ul style="list-style-type: none"> • Incident report book • AED & first-aid kit • Emergency numbers General: <ul style="list-style-type: none"> • All incidents are reported immediately and an incident report form completed • First-aid supplies available from Health & Safety Office on request • List of trained first-aiders & AED users available on the DIT website • Online hazard reporting facility available 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members	Ongoing

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Use of Ladders / Working at Height Staff are not permitted to use ladders/work at height	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Lone Working/ Out of Hours Access	<ul style="list-style-type: none"> Accidents and any incidents 	<ul style="list-style-type: none"> As per the FOCAS institute policy. Controlled by swipe access Mandatory training given to all CREST staffs and students. Sign in with the details Buddy system in the place 	<ul style="list-style-type: none"> Maintain the standard FOCAS policy. 	<p>With current controls: L</p> <p>With Actions applied: L</p>	<ul style="list-style-type: none"> CREST Team Members 	<ul style="list-style-type: none"> Ongoing

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Trips Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Injuries • Medical emergencies • Accidents and incidents • Missing persons • Substance abuse • Road Traffic Accidents • Inclement weather • Site terrain • Chemical hazards • Biological hazards • Human Factors 	<ul style="list-style-type: none"> • DIT Fieldtrip Guidelines (Edel) in place • Separate fieldtrip risk assessment template completed for each fieldtrip and control measures implemented • Information provided to fieldtrip participants • Elearning programme available to participants on request 	<ul style="list-style-type: none"> • Maintain standards • Ensure risk assessments are carried out for each fieldtrip 	With current controls: L With Actions applied: L	CREST Team Members DIT Health & Safety Office	Ongoing

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Work Placement Training events for industries Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Injuries • Accidents and incidents • Lack of familiarity with work environment and work practices 	<ul style="list-style-type: none"> • Risk assessment carried out and control measures implemented • Work placement factsheets provided to participants • Pre-placement induction safety talks available from the Health & Safety Office • DIT Placement Mentor available • Guidance notes available to students • All incidents are reported to DIT • Insurance cover provided • Training and supervision given to students where required 	<ul style="list-style-type: none"> • Maintain standards • Ensure risk assessments are carried out for all work placements 	With current controls: L With Actions applied: L	CREST Team Members DIT Health & Safety Office	Ongoing

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Events Hosting Events include: <ul style="list-style-type: none"> • Induction of Interns • Project Students (School of Chemical & Pharmaceutical Sciences) • Eureka students • Industrial day • Information seminar Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Injuries • Accidents and incidents • Unfamiliar with DIT premises and emergency plans 	<ul style="list-style-type: none"> • Full induction carried out by CREST • Risk assessment carried out and control measures implemented • Emergency plans in place as per risk assessment • Report all incidents and accidents to DIT 	<ul style="list-style-type: none"> • Maintain standards • Ensure risk assessments are carried out where necessary 	With current controls: L With Actions applied: L	CREST Team Members	Ongoing

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Conferences / Seminars Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Travel to and from • Road traffic accidents • Unfamiliar with venue • Medical emergency • Missing persons 	<ul style="list-style-type: none"> • Taxi vouchers available to staff • Staff obey rules of the road if driving or cycling • Adequate insurance, tax and NCT on vehicles used for transport • Familiarise yourself with local emergency procedures and first-aid arrangements • Report defects and incidents to venue management or Gardaí where necessary • Approval sought from Line Manager as per DIT procedures 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members	Ongoing

OPERATIONAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Storage Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Explosion, fire, various reactions as a result of improper/incorrect storage of chemicals • Inadequate storage • Improper storage • Inadequate space for safe manual handling • Poor housekeeping • Slips, trips and falls • Unsafe access and egress • Inadequate lighting and/or ventilation 	<ul style="list-style-type: none"> • Only competent staff enter storage areas • Safe access and egress • Storage avoided above shoulder height where possible • Items stored appropriately and segregated where required • Storage cabinets/units secure and fit for purpose • Locking system in place for storage cabinets/units • Step ladder available for accessing higher shelving units • Staff trained in manual handling and apply training: see 'Manual Handling' also • Appropriate signage in place • Items not stored in walkways • Defects reported immediately • Adequate lighting and ventilation in place 	<ul style="list-style-type: none"> • Maintain standards • Dispose of chemicals on a regular basis 	With current controls: L With Actions applied: L	CREST Team Members	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Sensitive Work Groups: Pregnant Employees /Students & Nursing Mothers	<ul style="list-style-type: none"> • Harm to Mother, unborn child or breastfeeding baby • Physical risks • Chemical risks 	<ul style="list-style-type: none"> • Risk assessment carried out for pregnant employees/students and control measures implemented as identified and necessary by Health & Safety Office • Room available (Room 225, DIT, Kevin Street) available for resting, breastfeeding and expressing milk • Follow medical advice 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members DIT Health & Safety Office	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Sensitive Work Groups: Young Persons No circumstances / events where young people are present except where a student starting his/her course is 17 years old.	<ul style="list-style-type: none"> • Injuries • Accidents and incidents • Lack of training and experience • Lack of familiarity with DIT work environment, work practices and emergency plans • Physical risks • Chemical risks • Biological risks • Hours of work 	<ul style="list-style-type: none"> • Induction process completed by CREST • Induction available from the Health & Safety Office on request • Elearning available from Health & Safety Office • Training and supervision given • DIT Child Protection Policy in place • DIT emergency plans in place • All incidents are reported to DIT • Student support services available • Garda vetting in place 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members DIT Health & Safety Office	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Sensitive Work Groups: People with Disabilities	<ul style="list-style-type: none"> • Lack of access/egress • Difficulty with evacuation • No risk assessment (RA) completed 	<ul style="list-style-type: none"> • DIT Disability Office send information to DIT Health & Safety Office • Risk Assessment carried out by the Health & Safety Office • Personal Emergency Egress Plan (PEEP) completed where necessary • Reasonable accommodation identified in risk assessment • Lift present and in working order • Disability Support Service available • Disabled toilet: ground floor Annexe: location marked on building maps • Induction/Elearning available from Health & Safety Office on request 	<ul style="list-style-type: none"> • Maintain standards 	<p>With current controls: L</p> <p>With Actions applied: L</p>	CREST Team Members	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Sensitive Work Groups: New Recruits	<ul style="list-style-type: none"> • Lack of experience • Lack of training • Injuries • Accidents and incidents • Lack of training and experience • Lack of familiarity with DIT work environment, work practices and emergency plans 	<ul style="list-style-type: none"> • Induction available (in person or online) from Staff Training & Development, including a Health & Safety section • Health & Safety Elearning available from the Health & Safety Office • Line Manager gives induction for CREST • Mandatory training to be completed as soon as possible after recruitment • CREST SOPs in place and communicated to new recruits • Training and supervision in place by management 	<ul style="list-style-type: none"> • Maintain standards 	<p>With current controls: L</p> <p>With Actions applied: L</p>	CREST Team Members	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Sensitive Work Groups: Undergraduates	<ul style="list-style-type: none"> • Lack of experience • Lack of training • Injuries • Accidents and incidents • Lack of familiarity with DIT work environment, work practices and emergency plans 	<ul style="list-style-type: none"> • Induction available from the Health & Safety Office on request • Elearning available from Health & Safety Office • Emergency procedures in place for Kevin Street • First-aid facilities available • Safety induction given by supervisors where required • Task-specific instructions/ demonstrations provided by staff where required • Student support services available 	<ul style="list-style-type: none"> • Maintain standards 	<p>With current controls: L</p> <p>With Actions applied: L</p>	CREST Team Members	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Sensitive Work Groups: Postgraduates	<ul style="list-style-type: none"> • Lack of experience • Lack of training • Injuries • Accidents and incidents • Lack of familiarity with DIT work environment, work practices and emergency plans • Remote working 	<ul style="list-style-type: none"> • Induction available (in person or online) from Staff Training & Development, including a Health & Safety section • Health & Safety Elearning available from the Health & Safety Office • Line Manager gives induction for CREST • Mandatory training to be completed as soon as possible after recruitment • CREST SOPs in place and communicated to new recruits • Training and supervision in place by management • Ensure plans in place with CREST where remote working takes place 	<ul style="list-style-type: none"> • Maintain standards 	<p>With current controls: L</p> <p>With Actions applied: L</p>	<p>CREST Staff and Postgraduate Students</p> <p>DIT Staff Training & Development</p> <p>DIT Health & Safety Office</p>	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Stress Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Physical health effects • Mental health effects • Behavioural effects • Cognitive effects • Workload 	<ul style="list-style-type: none"> • Communication between staff and management • Employee Assistance Programme (EAP) in place • Occupational Stress Management Policy & Procedures in place • Risk Assessment carried out by management • Training courses available on Stress Management, personal skills etc. to staff • Student services and Student Counselling available 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members DIT Staff Training & Development	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	<p>Violence (including Cash)</p> <p>Small amounts of cash are sometimes present where a collection occurs for conferences etc. This is securely stored.</p> <p>Who is harmed:</p> <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Theft of money, chemicals etc. • Attacks/assault 	<ul style="list-style-type: none"> • Emergency Response Training (ERT) mandatory for staff • CCTV in place • Porters on duty at Front desk/Reception • DIT staff and students report suspect individuals to DIT Buildings Office • Adequate lighting in place • See Storage of Chemicals 	<ul style="list-style-type: none"> • Maintain standards 	<p>With current controls: L</p> <p>With Actions applied: L</p>	CREST Team Members	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Bullying & Harassment Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Effects on physical and mental well-being 	<ul style="list-style-type: none"> • DIT Dignity at Work: Anti Bullying & Harassment Policy in place • Dignity at Work contact persons available • Employee Assistance Programme (EAP) in place • DIT Procedure for complaints and investigations • Student support services available 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	<p>Welfare Facilities:</p> <p>Sanitary Facilities;</p> <p>Staffroom / Canteen</p> <p>Who is harmed:</p> <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Inadequate facilities • No potable water • No means for boiling water/heating food • No seating/resting area • No hand-washing facilities • Fire 	<ul style="list-style-type: none"> • Hot/cold water available in sanitary facilities • Disabled toilet available on ground floor and marked on maps • Sanitary/hand-washing facilities adequate • Defects reported to the Buildings Office <p><i>Facilities for seating and taking meals available at:</i></p> <ul style="list-style-type: none"> • Staff room has kettle, microwave/dishwasher • Fire blanket and CO₂ fire extinguisher available • Kevin Street: Canteen: Ground floor: Annexe & Staff room: 4th floor <p><i>Drinking water available:</i></p> <ul style="list-style-type: none"> • Staff room tap, ground floor • Water fountains in corridors 	<ul style="list-style-type: none"> • Maintain standards 	<p>With current controls:</p> <p>L</p> <p>With Actions applied:</p> <p>L</p>	<p>CREST Team Members</p> <p>DIT Buildings Office</p>	<p>Ongoing</p>

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Visitors Types of visitors: <ul style="list-style-type: none"> • Event Participants • Erasmus Students • Researcher • Industrial collaborator Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Lack of experience • Lack of training • Injuries • Accidents and incidents • Lack of familiarity with DIT work environment, work practices and emergency plans 	<ul style="list-style-type: none"> • Safety booklets and safety wallet cards available • Emergency and informational signage in place • Risk assessments completed for specific events where groups of visitors are expected • CCTV in place • Deliveries handled by Goods Inwards (DIT Building) • Visitors briefed on emergency procedures by the person they are visiting 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members FOCAS Management	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Contractors / Service Providers Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Unfamiliar with DIT buildings and safety procedures • Injury to contractors, staff, students, members of the public 	<ul style="list-style-type: none"> • CREST notify Buildings Office where contractors are coming onsite under their remit • Buildings Office control all contractors who also send communication sent to staff regarding works • Sign in required • Compliance with DIT code of practice for contractors • Signage in place • eLearning completed before contractors arrive on DIT premises • DIT Contractor safety badge issued and worn • Risk assessment and method statements completed and submitted to the Buildings Office • Good housekeeping standards maintained • Areas of works cordoned off 	<ul style="list-style-type: none"> • Maintain standards 	<p>With current controls: L</p> <p>With Actions applied: L</p>	<p>CREST Team Members</p> <p>DIT Buildings Office</p>	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Behaviour Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant women • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Aggression • Violence • Stress • Bullying • Harassment 	<ul style="list-style-type: none"> • DIT Dignity at Work: Anti Bullying & Harassment Policy in place • Employee Assistance Programme (EAP) in place • Occupational Stress Management Policy & Procedures in place • All incidents are reported immediately • DIT Disciplinary procedures in place • DIT Procedure for the Resolution of Disputes/Grievances in place • DIT training available on Stress Management, personal skills, voice use etc. 	<ul style="list-style-type: none"> • Follow procedures in DIT's Dignity at Work: Anti Bullying & Harassment Policy • DIT IS and DIT Buildings Office to maintain multimedia systems • Contact IS and Buildings Office if problems arise with multimedia systems 	With current controls: L With Actions applied: L	CREST Team Members DIT IS DIT Buildings Office	Ongoing

HUMAN FACTORS							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Personal Protective Equipment (PPE) CREST staff/postgraduate students: <ul style="list-style-type: none"> • Lab coat • Safety glasses • Gloves • Mask • Gloves • Face shield Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Improper fit and use • Incorrect type • Poor maintenance • Lack of training • Exposure to physical or hazardous substances • Slips, trips and falls • Lack of awareness of PPE requirements • Contamination 	<ul style="list-style-type: none"> • Appropriate selection of PPE • Consultation with staff • Inspection and maintenance of PPE • Staff arrange laundering for coats • Defects reported • Chemical storage provided for staff and students i.e. lockers • Training, information and supervision • Signage in place where PPE is required e.g. on lab doors • Students are not permitted into the lab without the relevant PPE • Follow manufacturer's instructions • PPE: personal use only 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members	Ongoing

CHEMICAL							
Ref	Hazard	Risk(s) Associated / Description	Control Measures		Risk H/M/L (with controls)	Person(s) Responsible	Target Date / Status
			Current Controls	Further Actions Required			
	Gas Gas Cylinders are present in: <ul style="list-style-type: none"> • Gas lab: basement • SEM Room • BET Room • Other temporary locations (this changes) Who is harmed: <ul style="list-style-type: none"> • Staff members • Students • Visitors • Contractors • Young persons • Pregnant • Postgraduates • People with disabilities 	<ul style="list-style-type: none"> • Gas leak • Fire • Explosion • Suffocation • Carbon monoxide poisoning • Asphyxiation • Oxygen may promote flammability in other materials 	<ul style="list-style-type: none"> • Inspection, Testing and Maintenance/Serviceing • Detection and monitoring systems in place • Adequate ventilation • Staff are competent and trained in the use of gas cylinders • Strict procurement procedures in place • Registered installer used for all installations, maintenance etc. BOC • Training, information and supervision • Restricted access • Minimum quantities stored on site; gas piped in from outside • Cylinders are stored in an upright manner and chained to the bench or trolley • Cylinders, regulators and associated equipment are kept clean and free from 	<ul style="list-style-type: none"> • Maintain standards 	With current controls: L With Actions applied: L	CREST Team Members DIT Buildings Office	Ongoing

			<p>grease, oil and other contaminants</p> <ul style="list-style-type: none"> • A regulator is used when connecting to a lower pressure system • Cylinders are never rolled along the floor/ground. Trolleys which are suitable are used • Leaking or damaged cylinders or those which cannot be properly identified must not be used • Damaged or unidentified cylinders must be returned to the supplier • Members of staff required to move cylinders are trained in manual handling • Where cylinders are no heavy they are carried 				
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CREST SPECIFIC HAZARDS RISK ASSESSMENT

1. Hazard: Chemical Agents/Substances Use
2. Hazard: Storage of Chemical Agents/Substances
3. Hazard: Transport of Chemical Agents/Substances
4. Hazard: Chemical & Clinical Waste/Disposal
5. Hazard: Fumehoods/Fume Cupboards
6. Hazard: Nuclear Magnetic Resonance (NMR)
7. Hazard: Graphite Furnace Atomic Absorption
8. Hazard: Gas Chromatography
9. Hazard: Atomic Absorption (ICP)
10. Hazard: Biological Agents
11. Hazard: Sharps, Surgical Blades, Syringes, Knives etc.
12. Hazard: Rubber and Plastic Tubing
13. Hazard: Laminar Flow Cabinets
14. Hazard: Centrifuges
15. Hazard: Laboratory Refrigerators, Freezers & Fridge-Freezers
16. Hazard: Mercury Thermometers
17. Hazard: Spillages
18. Hazard: Microscopes (Scanning Electron, Olympus etc.)
19. Hazard: Water Baths
20. Hazard: Glassware
21. Hazard: Homogenisers
22. Hazard: Hot Plates & Heat Stirrers
23. Hazard: Ultra Violet Light Sources (UV Light Box) & Trans-Illuminator
24. Hazard: Equipment Used for Demonstration Only
25. Hazard: Blood Sampling
26. Hazard: Stomacher Bags
27. Hazard: Hitachi SU-6600 Variable Pressure, Field Emission Scanning Electron Microscope (with Gatan Cryotransfer Stage) & Hitachi SU-70 Field Emission Scanning Electron Microscope
28. Hazard: Asylum MFP-3D-BIO Atomic Force Microscope
29. Hazard: Cressington 208C Carbon Evaporation Coating Unit
30. Hazard: Cressington 208HR Sputter Coater
31. Hazard: Spray Painting
32. Hazard: Power Tools (including hand tools)
33. Hazard: Manually Operated Hand Tools/Tools
34. Hazard: Rotary Evaporator
35. Hazard: Thermal Analysis
36. Hazard: Humidity Cabinet (SO₂ Cabinet)
37. Hazard: Compressed Air
38. Hazard: Ovens/Furnaces
39. Hazard: Atomic Plasma Source
40. Hazard: Falling Weights
41. Hazard: Vacuums and Pumps
42. Hazard: Salt Spray Chamber

Risks

- Illness, injuries from exposure

Control Measures

General

- Chemical agents risk assessments will be carried out for activities which are of such a duration or so frequently performed or involving such hazardous chemicals as to pose a risk of exposure to staff or students. Following the risk assessment measures may be specified to ensure that the risk is reduced to the lowest possible level. Measures may include substitution of one chemical for a less hazardous one, restricting the number of persons using or in contact with the chemical, engineering controls such as the use of a fume hood, training or the use of personal protective equipment
- Each laboratory must keep an up to date printed copy of all safety data sheets (SDS) for chemicals stored or used in that laboratory. When new chemicals are ordered the relevant SDS will be requested from the supplier. The SDS must be readily available to all lab users
- Before new chemicals are ordered staff must ensure that safety alternatives have been investigated. A safety alternative could be purchasing a solution rather than making up a stock from a hazardous dust forming powdered
- Staff must be familiar with the contents of the SDS and bring to the attention of students the hazards associated with the chemicals
- Staff must be aware of the spillage clean up procedures for the chemicals they use on a regular basis. Spill kits are supplied in each laboratory
- Toxic chemicals should be kept in a locked cupboard
- First-aid kits, eyewash stations and trained first-aiders are available in each lab

Storage of chemicals

- Ensure that all containers are in good condition, properly capped, and properly labelled.
- There should be no unlabeled container, and NO container should ever be labeled using the word WASTE or SPENT.
- Solutions or chemicals stored in containers other than their original container or waste must be labeled with the name of the chemical, the concentration if relevant, the hazard warning (e.g. toxic, corrosive, flammable etc), the name of the person responsible for making up the solution, the date the solution was made up and expiry date
- Store incompatible chemicals separately (Appendix 7 list of incompatible chemicals). Material Safety Data Sheets also provide information on incompatibility
- Do not store chemicals in alphabetical order without consideration for chemical compatibilities. An alphabetical system may cause incompatible materials being stored next to one another (e.g. butadiene next to bromine or chlorine)
- Do not store hazardous chemicals above eye level

Flammables

Flammable and combustible chemicals are materials which, under standard laboratory conditions, can generate sufficient vapors to cause a fire in the presence of an ignition source. Materials which generate sufficient vapors to ignite at temperatures below 38 °C are "flammables," whereas materials that require temperatures above 38 °C to provide sufficient vapors for ignition are "combustibles."

The following precautions should be observed when using these materials:

- Flammable materials must be stored in a flammables cabinet. The door of the cabinet should be kept closed when not in use.
- Segregate flammables from oxidizing acids and oxidizers.
- Volumes of flammables stored should be kept to a minimum. No more than 50 litres of flammable liquids should be stored in any laboratory and then only when there are suitable flammables cabinets.
- Consideration should be given to letting the supplier deliver flammables 'just in time'.

- Flammables in glass Winchesters should not be left on the bench in sunlight as they are likely to reach their flash point and cause an explosion and fire.
- Flammables must not be stored in fume hoods where there is a bunsen burner or other heat source.
- Secure screw caps on containers immediately following dispensing.
- Do not dispense into beakers and allow to remain at bench top level. Flammable and combustibles should be placed in a fume hood as soon as possible and used
- Do not allow flammable liquids to evaporate in a fume hood as a means of disposal.
- Eliminate ignition sources such as open flames, hot surfaces, operation of electrical equipment, and static electricity from areas in which flammable or combustible materials are used or stored.
- Refrigerators and freezers used for the storage of flammable and combustible liquids must be non sparking
- Ensure that there is proper bonding and grounding when transferring between metal containers or dispensing a flammable liquid from a large container or drum.

Personal Protective Equipment

- Laboratory coats must be worn at all times when using hazardous chemicals.
- Where there is a risk of a hazardous chemical splashing into the eyes, safety glasses must be worn with side protection. Ordinary corrective spectacles do not provide sufficient protection. Staff who wear spectacle will be provided with safety glasses that fit over their own glasses or prescription safety glasses.
- Staff must ensure that students wear appropriate eye protection.
- Contact lens wearers should alert staff to that fact so that appropriate first-aid can be provided in the event of an eye injury.
- Staff should ensure that the correct types of gloves are selected for work with hazardous chemicals. Latex gloves do not provide sufficient protection.

Safety Equipment

- Where emergency showers or eyewash basins are installed, these must be tested at least once per term.
- It is good practice to operate the eye wash station at least once per week.
- Eye wash bottles must be checked regularly to ensure they are in date. If the seal is broken the bottle must be replaced.
- Fume hood efficiency will be tested on an annual basis by technical staff.
- The filter on the Astecair 5000 (Lab KE-2043) should be tested and changed as required at a minimum once per year.

Risk: H/M/L:

With current controls: M

With actions applied: M

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Risks:

- Fire
- Explosion
- Reactions due to incompatible chemicals/solvents etc.
- Slips, trips and falls
- Incorrect use of substances due to incorrect labelling

Control Measures:

General Solvent Chemical Stores

- Solvent storage area is segregated from the main building and is kept locked at all times
- Key to chemical storage area is controlled and access is limited and controlled CREST management
- Restricted access
- Mechanical air ventilation in place
- Segregated storage of chemicals classified as Oxidising/Reducing/Toxic/Corrosive/
- Flammable
- Chemicals stored in sealed containers
- Log book for removal of chemicals from storage
- Prohibition of naked flames/ignition sources
- Refrigerator, freezers and fridge-freezers are spark proof (Lec standard)
- Fire retardant cabinets in place for chemicals
- Stock take carried out regularly
- New stock is dated when received
- Redundant chemicals to be listed for phased disposal
- Chemicals are not to be stored on floors of window sills
- General supplies e.g. paper towels etc. are not stored in chemical stores
- Good housekeeping ensured to enable safe manual handling and reduce slips, trips and falls

Chemical stores

- Chemicals are stored to a prescribed segregation protocol based on the UN system
- Toxics are kept in a locked cupboard in chemical storage area
- Flammable materials are stored in flame-proof cabinets in chemical stores
- Small volumes of Solvents are kept in metal cabinets in storage areas in labs
- Incompatible chemicals are stored separate from each other **Appendix**
- Flammable gases are stored outside and piped into building

Cleaning Chemicals

- Toilet cleaners etc are stored in designated areas
- Employees are instructed to read labels and adhere to the safety precautions prescribed

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Transport of Chemical Agents/Substances

Risks:

- Exposure to chemicals
- PPE such as white lab coat and safety glasses, gloves worn
- Hazardous substances are transited in a suitable container
- Need to get rest (break)
-

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Waste Disposal & Removal

Specialist waste:

- **Paint containers**
- **Waste oils**
- **Contaminated rags**
- **Spray booth filters**
- **Solid waste** e.g. contaminated gloves, paper towels, cotton wool, disposable loops, tissue culture bottles, petri-dishes, flasks and disposable pipettes etc.
- **Liquid waste** e.g. Organic and inorganic waste
- **Sharps** e.g. broken glass, pipettes, scalpel blades, small glass vials, tips and ampoules, sharp pieces of metal
- **Mixed wastes** e.g. Biohazard waste containing solvents

Risks

- Waste accumulation
- Fire
- Odour
- Vermin
- Ill-health
- Environmental damage
- Cuts from sharps e.g. pipettes, slides etc.
- Incorrect storage of waste materials
- Contamination
- Infection
- Spillages, slips, trips and falls
- Accumulation of materials on benches, floors etc. leading to slips, trips and falls

General Control Measures

- General waste and recycling bins present
- Dispose of waste appropriately in bins/containers provided
- Segregate waste as appropriate
- Waste is kept away from sources of ignition
- General waste removed on a regular basis by cleaning contractors
- Hazardous waste is labeled and is stored in a safe designated area while awaiting removal
- Hazardous waste is removed by specialist contractors with a valid permit
- Appropriate PPE provided and worn for waste handling
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report

form completed

- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Students receive safety induction from supervisors.
- Staff are adequately trained and are competent in the use of the equipment
- Hand-washing facilities available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

The following bags/containers are used in CREST:

Yellow Contaminated (hazardous) waste

Black Uncontaminated waste

Please confirm the following:

- **Yellow Bags**
Heavy gauge (500g) yellow bags must be used for all contaminated waste. This includes anything which has come into contact with blood. Yellow bags must be sealed by laboratory staff using tie clips and left at the inside of the door. They are then taken for incineration by a general operative. No glass or sharps may be placed in yellow bags. The bags must not be overfilled – empty when $\frac{3}{4}$ full. Bins are labelled accordingly.
- **Black Bags**
Black bags are used for uncontaminated waste such as instrument printouts and paper which has not come into contact with blood. These are incinerated. No glass or sharps must be placed in these.
- **Sharps Container**
All sharps (including broken glass, needles) must be placed in the ‘Sharpak’ containers provided. Do not overfill the containers as this makes it impossible to close them in a safe manner. These are incinerated.
- **Glass**
Large items of used uncontaminated glass are placed in a container for collection by a General Operative.
- **Incineration**
All waste for incineration is brought to the boiler room by a general operative until they are collected by “Healthcare Waste Management Services” for incineration. They are labelled with numbered tags provided by the company. Maintenance assign numbered tags to the labs which are logged.

Control Measures:

General

- Contaminated waste is placed in an approved UN biohazard bag or sharps bin
- Approval form completed and signed by laboratory supervisors and the Head of CREST before disposal
- Hazardous waste is tracked by CREST
- All waste chemicals are disposed of using an accredited disposal company and the C1 cert is retained
- Waste is stored in labelled bins in a designated area until removal
- A copy of documentation from the waste management company is kept on file in CREST
- Biohazard waste containers are suitable and have a biohazard sign
- Biohazard waste is kept separate to general waste

- When purchasing chemicals regard should be paid to how waste will be disposed of. Volumes purchased should be kept to a minimum to prevent the build-up of surplus chemical for disposal.
- Flammable wastes should be stored in a flammables cabinet
- Do not dispose of hazardous waste down the drains
- Avoid mixing heavy metal waste and used oil with waste solvents
- Do not mix aqueous waste with organic solvent- based waste
- Paper, gloves, cardboard, and other solid materials must not be mixed in with liquid wastes
- Hazardous waste must not be allowed to accumulate in labs. Arrange for disposal with CREST of Chemical & Pharmaceutical Science on a regular basis
- Non hazardous chemicals such as buffers may be washed down the drain
- Chemical waste can be mixed only if the chemicals are compatible and will not result in a hazardous reaction

Segregation of Wastes

Wastes for disposal should be divided into the following categories:

- Acids
- Caustics
- Chlorinated Solvents
- Non-chlorinated Solvents
- Mercury Wastes
- Oxidizing Agents
- PCB Wastes
- Reactive Chemicals
- Waste Oil
- Wastes with Heavy Metal Contamination

The proper segregation of waste chemicals is essential to promote safe storage of those chemicals as well as to facilitate the economical disposal of the chemicals. The list in the appendices sets out potentially incompatible wastes, waste components, and material along with the harmful consequences of mixing those materials together. This list does not include every possible hazardous chemical reaction, but should be used as a guide. The list indicates the potential consequences of the mixing of a **Group A** material with a **Group B** material. The lists of chemicals in Groups A therefore should be kept separate from those chemicals in Groups B:

Avoiding smells from drains:

- Much distress can be caused by smells from drains due to volatile solvents and smelly substances entering the drains.
- Please think about what is going down your drain - especially drains in fume-hoods as you may be unaware of the smell that is escaping.
- Technical staff should make sure that sink and drain traps are refilled regularly with water to prevent drain odours escaping

Liquid Waste

- Liquid waste is put into Pyrex and Duran bottles, and only filled two thirds full
- Bottles are marked with autoclave tape
- Bottle lids are loosened at least a half turn before autoclaving and resealed when removed from the autoclave

Solid Biohazard or Clinical Waste (e.g. petri-dishes, gloves etc.)

- Waste is should be stored in yellow UN approved Biohazard bags, suitably marked with a biohazard symbol and kept secure/locked and stored for only a short period of time, ideally in a yellow bin or wheelie bin with a biohazard symbol
- Biohazard waste is kept segregated from general waste
- Waste is removed regularly from laboratories and no build-up allowed
- Waste stored to ensure cleaning staff cannot access or remove it

Sharps e.g. lancets, scalpel blades, broken glass, tips, pipettes

- Sharps are disposed of in the sharps container, not an autoclave or yellow biohazard bag. Sharps containers are sealed when three-quarters full and discarded as solid hazardous waste by insert name of licensing company
- Sharps containers are fully sealed and regularly removed from the laboratory.
- Sharps are segregated from other waste and placed in clearly identifiable containers (yellow and sae sharps on them with a UN number)
- Two sharps containers in use include:
 - Cytotoxic sharps (purple lid) i.e. sharps contaminated with cytotoxic drugs and chemicals including carcinogens, cytostatic, cytotoxic, mutagens, and teratogens
 - Sharps contaminated with cell culture or microbiological reagents (blue lid)
- Sharps containers should only be filled to the mark and the container sealed shut. Sharps containers do not need to be autoclaved. Please inform the attendant in charge of biohazard waste, when waste is left for disposal. SOP W8 “UN Yellow Sharp Boxes”
- Levels of sharps used and disposed of is kept to a minimum
- Needles are never re-sheathed. Glass is never broken into smaller pieces

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Risks

- Exposure of staff/students/users to hazardous substances as a result of incorrect use
- Fan failure, filter blockage, spillages, accumulation of materials in the fumehood, etc.

Control Measures

- Staff (and students where it is deemed appropriate) are trained in the use of the fumehood
- Students receive safety induction from supervisors.
- Risk Assessments are completed for hazardous tasks carried out in the fumehood
- All incidents, including defects, are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Fumehoods are classified and given a hazard use rating in accordance with this table:

FUME CUPBOARD HAZARD RATING SCHEME		
HAZARD RATING*	Exposure Limit (ppm or g/m ³)	Minimum Face Velocity (m/sec.)
Class 1 - Slight	Over 100	0.4 - 0.6
Class 2 - Moderate	5 – 100	0.5 - 0.75
Class 3- High	Under 5	0.7 - 1.0

** Note: This rating may be revised with the issue of the new British Standard for Fumehoods/ Cupboards*

- For many substances, exposure limits are not available and in such cases it shall be assumed that a fumehood of at least Class 2 or Class 3 shall be required. Most laboratory manipulations should however only require the use of Class 1 fumehood. Fumehoods may only be used for work in or below the category for which it has been approved
- For the above classification scheme to work, it is necessary to know the face velocity of a particular fumehood, in order that its classification can be assessed. (This is measured with an anemometer, which should be available in CREST). Once this has been done, a notice can be affixed to the front and side of the fumehood, indicating its average face velocity at various sash heights, together with an indication of some of the substances which can be used therein to give a general indication to staff of its suitability for different categories of hazardous substances.
- For experimental purposes, each fumehood or unit should be allocated to the control of one person/research team only as cross mixing of chemicals may lead to explosions in exhaust ducts).
- It must be possible to close the sash quickly without any risk of disturbing the apparatus within the fumehood.
- The sash opening is not set above that at which the face velocity has been measured
- Air flow meters and fan failure warning devices are incorporated into each fumehood
- The sash shall be kept closed at all times except during set up procedures
- Hazard warning signs are posted in the laboratory when hazardous operations are in progress
- The rate of release of toxic or flammable vapours is minimised by experimental design or by the use of reduced amounts of reagents
- All fumehoods conform to latest BS-EN specification and are maintained to the same standard
- Face velocities at the fumehood entrance, at maximum opening, shall be tested regularly, recorded and should be no less than 0.5m/sec averaged out over the opening. (Ensure that the supply of air to the room is also in excess of the total exhaust of all hoods plus the general room exhaust)
- A preventative maintenance programme is carried out by CREST in conjunction with the DIT Buildings Office. The programme covers e.g. fan face velocity testing, containment testing, electrical supply, and motor and filter conditions (where appropriate). Replacements/repair is carried out as soon as possible.

- Microbiological work is not carried out a fumehood
- No explosive or potentially explosive materials are used in fumehoods unless specifically designed or modified for this purpose. Impact grade screens and other safety protective devices must be in place where there is any doubt
- No work is carried out in a fumehood that is used or rated as a ventilated storage cabinet (i.e. airflow <0.4mls) or has unnecessary equipment stored within
- Fumehoods are not used as a store for chemicals and no accumulation of chemicals occurs therein
- The researcher involved ensures the fumehood is suitable for the chemicals being used e.g. volatile oxidants, Perchloric acid or perchlorates. Hoods designated for these chemicals shall be clearly marked
- Spillages in the fumehood are cleaned up immediately using the correct procedure by a competent staff member
- Fume cupboards are never used as ventilated storage areas for chemicals. The proper functioning of fume hoods depends on a free flow of air through the unit and bottles, boxes, and equipment prevent this from occurring. (If chemicals *must* be stored, install ventilated shelves beneath the fumehood)
- Do not block the area at the back or the front airfoil with bench liner material or other objects
- Apparatus located within the fumehood shall be raised to allow free air passage under it e.g. via legs or using blocks.
- Factors that may adversely reduce the efficiency of the cupboard e.g. location near a door, passing traffic, incorrect sash position, storage of materials and equipment inside, use of centrifuge, hot plate or heat sources etc. must be considered
- After use:
 - Correct shutdown is carried out
 - The fan is run with the sash closed for a suitable period before switching off fumehood
 - All services are turned off and all substances/reagents returned to their designated storage area
 - All apparatus is removed and cleaned before replacement in designated area
- If energy conservation is necessary to areas where fumehoods are working, it may be necessary to retrofit them with HOPEC (Hand Operated Positive Energy Control) sashes which ensures optimum hood efficiency
- Staff are trained in manual handling and apply their training

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Nuclear Magnetic Resonance (NMR)

NMR Equipment includes:

- 3 phase electricity supply
- High Magnetic field
- SDE
- Cryogenic Gases
- Pressurised Gases (0.35 bar)

Risks

- Manual handling as a result of refilling gas containers
- Musculoskeletal disorders, eye strain, stress, muscular fatigue
- Electrocution
- Asphyxiation as a result of exposure to gases
- Severe burns as a result of contact with cryogenic gases

Control Measures

- All incidents (cuts, lacerations, punctures etc. of the skin) are reported to the supervisor (who is trained in first-aid) and an incident report form completed.
- Trained first aiders and a first-aid kit are available in the laboratory
- Students and users are instructed and supervised in the use of sharps/instruments e.g. razor blades, scalpel blades, scissors etc.
- Students receive safety induction from supervisors and a safety laboratory manual
- NMR equipment is installed, commissioned and tested in accordance with method statement and risk assessment provided by Bruker. (Ref Rev 2 Bruker :R.W.Munn, Feb 2004)
- NMR is maintained and used in accordance with the requirements of the manufacturer
- Magnet and NMR machine is CE marked
- 5 Gauss line (Chain posts) indicates delineated area where magnetic field may interfere with pacemakers, magnetic cards etc. This is signed
- Organic waste is collected in a waste solvent bottle for disposal in accordance with the COP for waste solvents
- Gas (O₂) detection system and alarm in place
- Code of practice on the safe transport of cryogenic materials in place
- All NMR deuterated solvents are used in small volumes
- Only a qualified electrician services and repairs the electricity supply
- All sample preparation takes place in the fume hood provided
- Copies of SDS are available
- DSE equipment is provided with good screen definition & a range of adjustments that ensure user comfort
- Fully adjustable DSE chair at DSE workstation desk are provided, Significant users provided with adequate breaks from the work
- Only qualified staff members operate machine (must be on approved list). Only authorised personnel permitted to enter facility

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: DIT Technical officer

Target Date/Status: Ongoing

Risks

- Fire from heated chamber
- Electrical: risk of electric shock and subsequent serious injury (possible cardiac defibrillation) from GTA 100 which generates currents of 30 – 40mA)
- Chemical exposure (fumes) from heating chamber which may be toxic or corrosive
- Injuries as a result of carousel protruding out

Control Measures

- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed.
- Trained first aiders and a first-aid kit are available in the laboratory
- Students receive safety induction from supervisors and a safety laboratory manual
- All staff and students wear PPE such as laboratory coat and safety glasses
- Students are instructed on the use of the instrument prior to use and instructed not to put any part of their body over the heating chamber when instrument is in use
- Instrument is serviced and service records are available
- Use by staff and students is minimal
- Area around instrument is kept tidy allowing access at all times
- GTA 100 contained in sealed box with separate power supply
- Only a qualified electrician services and repairs the electricity supply
- Copies of SDS are available where required
- Only qualified staff members and students operate machine
- The GTA and Argon gas **must** be turned off after instrument use

Further Actions Required:

- Extraction hood should be reengineered to be positioned behind heating chamber not above it

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: DIT Technical officer

Target Date/Status: Ongoing

Hazard: Gas Chromatography

Risks

- Fire as a result of high temperatures of manifold on Mass Spectrometer and from oven

- Fire as a result of FID detector
- Electrical: risk of electric shock and subsequent serious injury during maintenance/repair
- Chemical exposure from use of solvents and aliphatic hydrocarbons
- Gas risk as a result of hydrogen
- Burns as a result of hot injector port and oven

Control Measures

- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first aiders and a first-aid kit are available in the laboratory
- Students receive safety induction from supervisors and a safety laboratory manual
- All staff and students wear PPE such as laboratory coat and safety glasses
- Heat resistant glove provided for maintenance to injector port
- Students are instructed on the use of the instrument prior to use
- Instrument is serviced and service records are available
- Correct storage of all chemicals used
- Use by staff and students is minimal
- Area around instrument is kept tidy allowing access at all times
- Only qualified staff members and students operate machine
- The Helium gas **must** be left on at all times to preserve the column

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: DIT Technical Officer

Target Date/Status: Ongoing

Hazard: Atomic Absorption (ICP)

Risks

- Fire

- Gas: Risk of explosion from leaked acetylene if gas tap left open. Acetylene can form explosive mixture with air. May decompose violently at high temperature and/or pressure or in the presence of a catalyst
- Asphyxiation from acetylene gas
- Burns to body especially face from flames
- Biological exposure as a result of use of/contact with bovine serum

Control Measures

- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first aiders and a first-aid kit are available in the laboratory
- Students receive safety induction from supervisors and a safety laboratory manual
- All staff and students wear PPE such as laboratory coat and safety glasses
- Instrument is serviced and service records are available
- Correct storage of all biological agents
- Use by staff and students is minimal
- Area around instrument is kept tidy allowing access at all times
- Only qualified staff members and students operate machine
- Students instructed on the use of the instrument prior to use and instructed not to put any part of their body over the upright guard when flame is lit
- Acetylene Gas Detection system installed on the wall above and to the left of the instrument and calibrated, alarm will sound upon detection of acetylene
- Upright guard installed on top of instrument to allow heat and vapours vent to extraction system. Extraction hood above instrument connects to laboratory ventilation system
- Flame guard on front of instrument will extinguish flame if opened during analysis
- Gas for instrument only turned on when students ready to analyse samples
- Gas supply **must** be turned off after instrument use

Further Actions Required:

- Extraction hood should be reengineered to be positioned behind flame not above it

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: DIT Technical Officer

Target Date/Status: Ongoing

Hazard: Biological Agents/Species
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Groups of Biological Agents used by CREST include:

GROUP 1 BIOLOGICAL AGENT: One which is unlikely to cause human disease.

Group 1 biological agents rely on standard microbiological practices with no special primary or secondary barriers, other than a sink for hand washing.

GROUP 2 BIOLOGICAL AGENT: One which can cause human disease and might be a hazard to employees.

Group 2 biological agents rely on standard microbiological practices and access restricted to nominated workers only. Design of laboratories and containment level is according to Safety, Health and Welfare at Work (Biological Agents) Regulations, 1994 & amendment regulations, 1998.

A range of potentially infectious agents are isolated in the laboratories of CREST.

Modes of Transmission

There are several routes of transmission for infectious agents. Staff and students should be aware of the routes as prevention of transmission is critical to good control.

- **Inhalation**
 - A variety of agents infect by the respiratory route. This can be caused by aerosolization of the agent. An aerosol may be generated during a lab procedure.
- **Ingestion**
 - Some organisms are enteric pathogens and can infect by being eaten or drunk. Hand-to-mouth contamination may occur. Inanimate objects such as the telephone, pens, and pencils, may also become contaminated. When an individual touches these items they may pick up the agent and it may gain entry through the mouth or the mucous membranes if touched.
- **Penetration**
 - Some agents may gain entry into the body through accidental penetration. This could be by needle sticks, cuts with contaminated sharp objects, broken glass, scalpels, razor blades, or animal bites or scratches. Agents may also enter the body through previous penetrations or openings in the skin, such as open wounds, chapped skin, or skin conditions such as dermatitis and eczema. Certain agents may also enter the body through the mucous membranes of the eyes, nose, or mouth.

Risks:

Infection, disease, food poisoning etc. resulting from exposure by:

- Ingestion
- Skin contact
- Eye contact
- Inhalation
- Inoculation

Control Measures:

- The Health & Safety Authority (HSA) is notified 30 days prior to commencement (for the first time) of Groups 2 Biological Agents
- Specific biological risk assessments carried out at local level per experiment and before use
- Commercial reagents are handled and stored according to manufacturer's instructions. All cell, serum or plasma samples of commercial origin have been screened for Hepatitis B & C, HIV & II and were found to be negative (see package insert)
- Blood samples are taken from hospitals
- SOP/Protocol in place for the Handling of Biological Specimens
- Great care has to be taken when collecting samples from hospitals as they are not routinely screened. They are handled in accordance with safety protocols used in the hospital service. Samples are placed in a plastic bag and sealed. Samples are logged in a book under Name: Hospital No: DIT identification no., date. When samples are discarded into the bin this is logged in the book. Students are made aware that these are hospital samples.

- Biohazard signage is in place on doors of labs containing Group 2 Biological Agents
- SOPs in place for use, handling, storage and disposal
- PPE used/worn: lab coat, safety glasses, gloves
- Designated lockers for personal belongings
- Lab safety rules communicated and strictly adhered to
- Signage in place
- Spill kits available
- Use of fumehood/LFC where required
- Emergency plans in place
- All lab staff trained in first-aid, first-aid kit in each lab
- All incidents are reported to supervisor
- Adequate ventilation and storage of chemicals
- Training, information and supervision given to students
- Restricted access: students only permitted when staff are present
- Minimum quantities of substances on site
- Adequate handling and disposal of sharps: sharps container present and students instructed in use of same
- Disposal containers located close to each bench to reduce travelling/spillages
- Adequate cleaning of trays used for dissection
- Disinfection materials available on each bench at all times
- Surfaces disinfected after each lab session
- Labs cleaned after each session to reduce contamination
- Sterilisation of equipment
- Hand-washing facilities available in all labs
- Students instructed and supervised in correct techniques, hygiene, PPE, use of substances, hand-washing etiquette (washing and drying before and after labs) equipment etc.
- Eyewash station available in relevant labs
- No eating and drinks permitted
- Correct labelling of all materials, specimens and substances
- SDS available for chemicals in each lab

Hazard: Sharps, Surgical Blades, Syringes, Knives etc.

Risks

- Cuts, lacerations and punctures of the skin from careless handling, usage or disposal
- Infection from hazardous chemicals or organisms entering the body

Control Measures

- All incidents (cuts, lacerations, punctures etc. of the skin) are reported to the supervisor (who is trained in first-aid) and an incident report form completed.
- Trained first aiders and a first-aid kit are available in the laboratory
- Students and users are instructed and supervised in the use of sharps/instruments e.g. razor blades, scalpel blades, scissors etc.
- Students receive safety induction from supervisors and a safety laboratory manual
- Surgical scalpels are held only by the handle and stored in a safe place
- Pliers are used to remove corroded scalpel blades or tight fitting hypodermic needles from a holder or syringe. (Eye protection shall be worn when doing this as scalpel blades are very brittle and easily fragment under force)
- Surgical scalpels are held only by the handle and kept in a safe place
- Scalpel blades are held in forceps/pliers when being inserted into the handle or removed from it. New blades are pushed or pulled away from the body, not towards it.
- New needles and sharps are handled with the protective covering in place. Caps are not replaced on used needles. Users dispose of needles directly to the sharps container.
- Syringes and syringes without a needle attached must all go into a sharps container. Razor blades, lancets, scalpels, broken contaminated glassware and any other contaminated items that could cut or pierce the skin must also be placed in a sharps container
- Sharps containers for disposal of these items should be conveniently located and easily accessible in all work places in which sharps are used
- Needle caps are left in place until use
- Scissors are used instead of blades where possible when cutting
- Hands are not used to retrieve needles from vessels, instead the container is emptied onto a flat surface, and forceps are used to transfer needles
- Sharpness of a blade is never tested with a finger. Knives are held by the handle away from the edge of the bench and attempts to catch a falling blade are not permitted.
- A designated storage area for all sharp instruments is available
- Suitable storage is available or safety pins
- Blades are wrapped/sheathed and stored appropriately
- Designated puncture-resistant sharps containers are used for the disposal of all needles, blades and other sharps
- Sharps are never disposed of with regular waste or in regular rubbish bags
- Needles and syringes are rendered unusable by destroying them with pliers, and placing them into the sharps container
- Sharps containers comply with the latest BS EN Specification for Sharps Containers
- Sufficient sharps containers are available in relevant areas/laboratories
- Sharps containers are sealed when three-quarters full and disposal is arranged by DIT
- Broken glassware and sharps that may be contaminated with infectious materials should be cleaned up using mechanical means, such as brush and dust pan, tongs, or forceps. Broken glass should not be picked up by hand
- Contaminated needles must not be bent, recapped, or removed unless there is no feasible alternative

NOTE: Sealed, robust sharp boxes, duly marked may be disposed of in the central skip.

Prevention of Needle Stick Injury

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Risks

- Sudden release of gas or liquid resulting from defective tubing or incorrect securing of tubing to nipples/taps, which can lead to fire or explosion
- Release of hot liquids or mains water under pressure
- Various personal injuries
- Damage to property and structures
- Fire
- Aerosols

Control Measures

- All incidents (burns, defects etc.) are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed, trained and supervised in the use of Bunsen Burners, rubber and/or plastic tubing
- All rubber and plastic tubing is checked periodically for cracks or other damage, prior to use. Replacement is made promptly where necessary
- Checks are made to ensure gas is completely turned off even if no flame is visible as fire can still be present in a Bunsen Burner and the rubber tubing hot
- Rubber tubing is not used on permanent installations connected to laboratory services. Clear Neoprene plastic tubing is used instead
- Excessive lengths of tubing which may lose their identity or which may trail and pose tripping hazards or which may trail into hot/corrosive areas are not used/permitted
- Tubing for use with organic solvents is chosen carefully. The suitability of material is checked for each solvent.
- Tubes to filter pumps and cooling circuits are secured by a jubilee clip fitting. The tube carrying the outflow is firmly anchored in the drain and free from danger of 'kinking'
- Where aerosols could be created, the Bunsen Burner must be used in the fumehood
- Students receive safety induction from supervisors and a safety laboratory manual
- Fire blanket available in lab
- Running water and first-aid kit available for burns
- Appropriate PPE used/worn: lab coat, safety glasses, gloves
- Designated lockers for personal belongings to reduce clutter
- Lab safety rules communicated and strictly adhered to
- Signage in place re unauthorised access to lab
- Emergency plans in place
- Restricted access: students only permitted when staff are present

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Risks

- Occupational illness due to exposure of potentially hazardous biological agents (e.g. infectious organisms), toxic chemicals, including carcinogens or radioactive materials
- Fire: build-up of vapours from volatile or toxic chemicals inside unducted cabinet
- Damage to eyes due to UV light
- Exposure of a user to infectious agents, Fire and/or Explosion

Control Measures

- Trained first aiders and a first-aid kit are available in the laboratory
- Suitable type of cabinet is purchased taking into account its use, risk level of the agent to be used, degree of protection required, whether volatile chemicals or radioisotopes will be used, type of procedure to be carried out etc.
- LFC's are tested and certified after installation, after relocation and annually by an approved company insert name and details
- SOP in place and implemented?
- Users are trained in the correct use and operation of the LFC, in addition to hazards associated with it.
- Users adopt good aseptic procedures and personal habits.
- Users wear and use appropriate specified PPE
- Students receive safety induction from supervisors and a safety laboratory manual
- Laboratory rules in place, communicated to users and adhered to
- LFC's comply with the latest BS-EN standard for same
- LFC's are certified on installation, movement, on change of HEPA filter, annually and as necessary. Written records are kept
- LFC's are only used when the fan is on and the airflow indicator is in the safe position.
- Airflow is measured regularly (at least annually) and recorded
- If the cabinet has a glass-viewing panel that may be opened, this should not be raised when work is in progress
- On completion of a work session, the working surfaces are wiped with an approved disinfectant. The wire grids protecting the pre-filters shall be examined regularly and cleaned with a disinfectant soaked cloth
- Ultra-violet (UV) lamps are not effective for disinfecting cabinets. If fitted, they must not be switched on during use of the cabinet, as they may be a safety risk to operators
- Class II Type A cabinets shall not be used with explosive flammable or toxic substances
- Class II Type B1 cabinets shall not be used with explosive flammable substances
- Safety cabinets are never used as storage areas or overloaded with materials, as this will disrupt the airflow pattern
- Bunsen burners or other equipment that would cause air turbulence and loss of containment are not used in a LFC
- Cabinets are installed out of traffic areas, away from air movements and doors so as to maximise containment.
- A strict maintenance system covering airflow measurements, HEPA filter replacement, leaks, noise, vibration, lighting etc. is in place at FOCAS management level.

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: FOCAS Team Members

Target Date/Status: Ongoing

SOP for Laminar Flow Cabinets

Start-up Procedures:

- Turn on the UV if appropriate for 15 minutes prior to use. UV irradiation is effective in killing many microorganisms. Ensure that the sash is in appropriate position
- Turn off UV lights and turn on fluorescent light and cabinet blower
- Check the air intake and exhaust grilles for obstructions
- If the cabinet is equipped with an alarm, test the alarm and switch it to the "on" position. Confirm inward airflow by holding a tissue at the middle of the edge of the viewing panel and ensuring that it is drawn in
- Disinfect the interior surfaces with a suitable, non-corrosive disinfectant
- Wait 5 minutes to purge airborne contaminants from the work area

Preparing work in the LFC:

- Before using, wipe work surface with 70% alcohol or any other disinfectant suitable for the agent(s) in use. Wipe off each item you need for your procedures before placing it inside cabinet.
- DO NOT place any objects over the front air intake grille. DO NOT block the rear exhaust grille.
- Segregate contaminated and clean items. Work from "clean to dirty."
- Place a pan with disinfectant and/or sharps container inside the LFC for pipette discard.
- DO NOT use vertical pipette discard canisters on the floor outside the cabinet.
- It is not necessary to flame items. When deemed absolutely necessary, touch-plate microburners equipped with a pilot light to provide a flame on demand may be used.
- Alternatively, use aseptic techniques and sterilized labware.
- Move arms slowly when removing or introducing new items into the LFC.
- If you use a piece of equipment that creates air turbulence in the LFC (such as a microcentrifuge or vortex), place equipment in the back 1/3 of the cabinet; stop other work while equipment is operating.
- Protect the building vacuum system from biohazards by placing a cartridge filter between the vacuum trap and the source valve in the cabinet.
- Clean up spills in the cabinet immediately. Wait 10 minutes before resuming work.

Procedures upon completion of the work:

- Close or cover open containers before removing them from the cabinet.
- Surface disinfects objects in contact with contaminated material before removal from the cabinet.
- Turn off the fluorescent light and cabinet blower when appropriate (some cabinets must be left on at all times; if you are unsure, check with your cabinet certifier or safety officer or building maintenance personnel).
- When work is finished, remove all materials and wipe all interior surfaces with 70% alcohol or any other disinfectant suitable for the agent(s) in use.
- Remove lab coat, gloves and other Personal Protective Equipment (PPE) and wash hands thoroughly before leaving the laboratory.

Use of hazardous substances:

- Turn on the cabinet light, check that the air intake and exhaust grills are not obstructed and purge the cabinet of 'dirty' air by running the fan for at least 5 minutes.
- Ensure hands and arms are sterile by washing with germicidal soap and don laboratory coat, gloves etc.
- Disinfect the interior work surfaces with 70% ethanol in water or recommended disinfectant. Place an absorbent, plastic lined bench pad in the cabinet, taking care not to cover the air grilles at front and rear.
- Place all required materials in the cabinet in such a way that clean items, cultures and receptacles are segregated from contaminated ones. Locate clean pipettes, cultures, flasks etc. not less than 10cm from the front of the cabinet and contaminated discard trays for cultures, plates and other items to the rear of the cabinet.

- N.B. Since airflow is downward, do not pass contaminated materials over clean items. (This may be prevented by good work organisation).
- In so far as possible, avoid any interruptions after the work as commenced to minimise loss of containment.
- Ensure the laboratory doors are kept closed during work to prevent disruption of the air stream and loss of containment.

Training

- Every employee working in a LFC must be trained in its correct use and always adhere to biosafety precautions when conducting experiments. This will effectively reduce or eliminate the risk of exposure to potentially hazardous agents used in research
- Have a good understanding of the different types of cabinets and how they work.

Risk Remaining

LFCs in which chemical and radiological materials are used require design modifications in the cabinet or building exhaust system to include charcoal filters, since HEPA filters do not retain agents which vaporise or sublimate. Evaluation of inherent chemicals must be part of assessment when selecting a LFC.

When using a LFC ensure that the UV light source is off. Exposure to UV light should not occur as UV can damage the eyes. When working with a source of UV light, protective goggles (UV rated) should be worn (HSA, 2010).

Servicing a Biological Safety Cabinet.

LFCs should be serviced annually, as required or if they have been moved. Cabinets should not be used if it has not been serviced.

Laminar Air Flow Cabinet

A Laminar Air Flow cabinet is unlike a LFC in that there is no operator protection, there is only protection for the product/sample. Therefore, this type of cabinet should not be used for microbiological work as the contaminated air is being constantly blown onto the operator (WHO, 2004a).

CREST has:

- No laminar flow cabinets
- Operational bench for work with nonhazardous materials

Laminar flow clean cabinets are not LFCs. They protect the product or research from contamination, but they do not protect personnel or the environment. The clean cabinet discharges HEPA filtered air across the work surface and toward the user. The airflow can be directed either horizontally or vertically. For this reason, biohazardous, radioactive, chemical, toxic, mutagenic, and carcinogenic agents must not be used in a laminar flow cabinet.

When planning work staff are reminded to consider the equipment available to them and the risks associated with working with potentially infectious materials.

Use of Laminar Flow Equipment

Measures must be taken to minimize airflow pattern disturbances when using Biological safety cabinets and Laminar flow cabinets. The effectiveness of a Biological safety cabinet can be reduced when airflow disturbances are caused by moving your arms or equipment in and out of the cabinet, people walking rapidly by the cabinet, open lab doors, and blocking grilles with equipment or supplies.

Instructions on Use of Laminar Flow Cabinets

- Before starting work, wipe down the Biological safety cabinet or Laminar flow cabinet work surfaces with 70% alcohol. Turn the unit on and let it run for approximately 10 minutes prior to starting work

- Plan your work; place any materials needed into the cabinet
- Do not block the front air intake grill or the rear exhaust grill
- Segregate the contaminated and clean items. Work from clean to dirty
- Minimise the use of flames inside the cabinets. They can cause airflow disturbances and damage to the cabinet filters
- Chemicals in general should not be used within a Biological safety cabinet. If they must be used, only small quantities can be used in a Class I or Class II Biological safety cabinet that exhausts to the outside through a duct system. Flammables should not be used in any Biological safety cabinet
- Do not store excess equipment in the cabinets; this can cause airflow disturbances.
- Clean the interior of the cabinet using 70% alcohol immediately following a spill or splash and at the end of the work session
- Allow the cabinet to run for several minutes at the end of the work session to ensure all contaminants have been removed

Certification of Laminar Flow Equipment

The Laminar flow cabinet must be certified on an annual basis by an outside contractor.

Hazard: Centrifuges

Risks

- Burns as a result of physical contact with the moving head/revolving parts
- Disintegration of machine parts/ejection of broken glass tubing/materials as a result of mechanical breakage of the rotors caused by overloading or corrosion
- Severe vibration caused by unbalanced rotors
- Fire and/or explosion as a result of generation of flammable or explosive vapours
- Personal exposure to vapours produced over the OELV as aerosols may be produced
- Various personal injuries
- Damage to property and structures
- Spillages inside [Appendix](#) for Spills Procedure

Control Measures

- All incidents (burns, defects etc.) are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised in the use of rubber and/or plastic tubing
- Special attention is given to prevent the generation of hazardous aerosols when microbiological samples are centrifuged. Controls are appropriate to the biological risk levels present in the samples
- Staff are adequately trained and are competent in the use of centrifuges, particularly in relation to biological samples
- Staff are trained in rotor balancing and safe operating techniques
- Students receive safety induction from supervisors and a safety laboratory manual
- All centrifuges conform to the latest EN BS specifications and are maintained to such standards. This necessitates the provision of centrifuges with interlocked time delay opening mechanism to prevent access to moving parts
- Centrifuges present are appropriate to the work being performed
- Access to the rotor is prevented when the power is switched on via the interlocked door/cover i.e. the rotor cannot operate when the cover is up
- Speed, sample tube size, and the number of tubes is selected prior to centrifuge use
- Centrifuges are enclosed and securely fixed to a workbench to prevent movement and sited where the vibration will not cause any items to fall from shelves
- Only accessories e.g. rotors, buckets etc. recommended by the manufacturer are used

- Loaded rotors are carefully balanced and kept within the stipulated weight limits
- Flammable liquids are not used in or near a centrifuge unless the rotor is intrinsically safe
- Centrifuges are kept clean (using non-corrosive materials), regularly inspected and maintained to manufacturers recommendations
- Speed is always increased slowly when starting the centrifuge
- Details of all centrifuge use is entered in a logbook located in the laboratory
- When used in fumehoods precautions are taken to ensure air turbulence does not allow outflow of fumes e.g. loss of fumehood containment
- When it is necessary to centrifuge explosive/flammable mixtures, a purging and diluting system using inert gas is incorporated
- When used with biological samples, sealed centrifuge buckets are necessary, in case a tube breaks releasing hazardous aerosols. All handling, filling and removal of cultures from buckets is carried out in the biological safety cabinet
- High speed rotors are prone to metal fatigue due to the higher forces exerted on them, so a log book of their time in usage is kept, otherwise rotor failure may occur with disastrous results. This record shall be in addition to the instrument usage logbook.
- Special safety procedures shall be put in place when centrifuging biological fluids due to the variety of devices employed like high speed centrifuges, continuous flow centrifuges, zonal centrifuge rotors etc. used in pilot plants or large scale experiments. Assessing the risk from the generation of hazardous aerosols, lack of containment or poor sterilising and cleaning methods is carried out in advance, in all cases.
- Where Ultra-Centrifuges or other specialised centrifuges are used communally, strict rules are enforced to ensure safety and proper maintenance of same. In addition because of the extreme hazards that arise from misuse of ultra-centrifuges, an effective training programme shall be provided at FOCAS management level for the safe use and care of these instruments.
- All users adhere to the centrifuge schedule where booked. This is managed at local level
- The centrifuge logbook logs relevant information such as time of runs, total rotor use (hours), maintenance, de-rating information and other information as suggested by the manufacturer
- Centrifuges used in biological research are thoroughly cleaned after use using this procedure:
 - Clean and remove any spilled material from the buckets or rotor using a soft brush by rinsing and brushing
 - Rinse each bucket and tube cavity thoroughly with deionised water at least 3 times
 - Wash the buckets and the rotor with a non-detergent soap solution (Conc. < 1%)
 - Remove all traces of the soap solution by rinsing the buckets and/or rotor with deionised water
 - Allow draining thoroughly by inverting and allowing drying. Ensure that no residual water is on the rotor or in buckets prior to placing in storage
 - Follow manufacturer's instructions regarding cleaning solutions and cleaning procedure to avoid corrosion or damage to the buckets and rotor
 - Frequent examination of all centrifuge parts shall be carried out after cleaning and drying. The rotor shall be closely examined for evidence of early corrosion and "O" seals shall be examined for signs of deterioration. The rubber "O" seals fitted on sealed buckets shall be coated with the manufacturer's recommended lubricant.
- The ultracentrifuge may only be used by authorised persons (a list of authorised persons will be posted beside the centrifuge)
- A copy of the operational manual should be made and kept by the technician
- Rotors are rated for certain maximum speeds: these must be known by staff
- Before operating:
 - a. Ensure centrifuge bowl and tubes are dry.
 - b. Ensure the centrifuge spindle clean.
 - c. Avoid overfilling of tubes and bottles.
 - d. Ensure rotor is properly seated on drive hub.
 - e. Make sure tubes are properly balanced in rotor
 - f. Ensure O-rings properly attached to the rotor.
 - g. Ensure the rotor has been properly secured to drive

- h. Make sure the run is proceeding normally before you leave the area.
- i. If infectious material was placed in the centrifuge, WAIT 10 minutes before opening the centrifuge lid.
- j. If leak or damage has occurred, close the lid and plan proper decontamination and cleanup.

Maintenance/Cleaning

- Keep rotors clean and dry
- If spills occur, make sure rotor has been cleaned/decontaminated
- If salts or corrosive materials were used, ensure they have been removed from the rotor.
- Avoid mechanical scratches. The smallest, scarcely visible scratch allows etching to enlarge the fracture, which is subject to enormous rupturing forces at high g's, leading to rotor explosion
- Avoid bottle brushes with sharp metal ends and harsh detergents when cleaning rotor heads.
- After proper clean-up, rinse the rotor with de-ionized water

Inspections

- Technical staff are responsible for carrying out regular checks on the ultracentrifuge
- Check the rotor for rough spots, pitting, and discoloration. If discovered, check with the manufacturer before using
- During servicing request that the engineer examines the rotors for damage
- Consult the centrifuge manufacturer and centrifuge log for the derating schedule for the rotor. Remember this is why a log of centrifuge use is kept

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: FOCAS Team Members

Target Date/Status: Ongoing

Hazard: Laboratory Refrigerators, Freezers & Fridge-Freezers

Risks

- Reactions between chemicals/substances/materials where they are incompatible and stored together
- Release of vapours/fumes from chemicals/substances/materials
- Contact with materials due to overloading, inadequate labelling, incorrect storage/sealing of

chemicals/substances/materials

- Ingestion of substances due to personal food and drink storage

Control Measures

- Refrigerators, freezers and fridge-freezers are all 'Lec' or X-rated laboratory refrigerators, which are spark-free, lockable, have a temperature display, an alarm and automatic defrost
- Chemicals/substances/materials are stored correctly and refrigerators, freezers and fridge-freezers are not overloaded
- Chemicals/substances/materials stored are adequately labelled with labels stating the name, date of preparation/acquisition and person responsible with a water-resistant marker/pen
- Food and drink is not permitted in laboratory refrigerators, freezers and fridge-freezers, and signage is displayed on the outside of the units to this effect
- Defects are reported to management in CREST immediately
- When power is due to be turned off, the DIT Buildings Office send a communication and back-up generators are used to power laboratory refrigerators, freezers and fridge-freezers
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Mercury Thermometers

Risks

- Poisoning as a result of absorption through the respiratory tract or through unbroken skin. It has cumulative effects
- metallic taste, nausea, abdominal pain, vomiting, diarrhoea and headache as a result of high exposure concentrations

- Severe nervous disturbance, insomnia, loss of memory, irritability and depression as a result of chronic exposure (from continual exposure to small concentrations)
- Loosening of teeth, dermatitis and kidney damage as a result of severe prolonged absorption
- Chemical reactions e.g.
 - With ammonia to produce an explosive solid
 - It can cause severe corrosion problems because of its ease in forming amalgams
 - Violent reaction with dry Bromine

Control Measures

- Mercury may be transported only in small quantities in plastic containers (glass bottles are unsuitable because breakages will result in possible spillage over a large area)
- Mercury may be handled only in a fume-hood and over a suitable plastic tray (mercury may react with a metal tray or may be absorbed into a porous tray e.g. wood)
- Skin contact should be avoided. Wash hands thoroughly after using mercury
- Secondary containment must be used on all apparatus containing Mercury e.g. manometers, McLeod gauge, Mercury switches. Care must be taken with mercury in glass thermometers
- As for all other vacuum pumps, the exhaust from vacuum pumps on systems containing mercury must always be vented either to the outside or into a ducted fumehood

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Spillages

Risks

- Contact with materials
- Slips, trips and falls, and increased risk of exposure as a result
- Environmental damage

Control Measures

- SOP (Appendix)

- Materials are correctly stored and accumulation is not allowed to occur in the area designated for storage of materials before autoclaving
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory

Spillages procedure and spill kits

- Spill procedure and SOP in place and posted (appendix)
- Appropriate spill kit(s) in place: details of types and locations
- Staff trained in spill procedure

Contents of a Biohazard Spill Kit:

1. PPE: A disposable white coat, apron, if required, appropriate gloves, safety glasses, shoe coverings, face mask for aerosols
2. A roll of paper towel
3. Fresh 10% bleach solution or other appropriate disinfectant
4. Spray bottle with disinfectant
5. Yellow biohazard bags or autoclave bags
6. Sharps container
7. Forceps
8. Lidded container
9. Tape to restrict access
10. Sign restricting access: time and date should be included
11. Incident report form (available from Front Desk/Reception)

NOTE: Bleach/sodium hypochlorite loses its effectiveness upon storage, even in concentrated forms and is inactivated in the presence of organic materials. Bleach is also toxic; it denatures rubber and plastic materials, corrodes metal and bleaches fabrics. Materials containing bleach cannot be autoclaved.

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Microscopes (Scanning Electron, Olympus etc.)

Risks

- Eye infection, eye strain from use
- Cuts from broken slides
- Infection, allergies from multiple users/shared use
- Manual handling injuries as a result of moving microscopes
- Musculoskeletal disorders from prolonged use with poor posture

Control Measures

- Glasses, contact lenses worn where necessary, slide image can be magnified as much as required. Eye pieces can be adjusted separately. When viewing slides at high magnification, students are instructed to start with the lens close to the slide and focus by moving the slide away from it
- Adequate lighting provided in the laboratory
- Spillages are cleaned up immediately
- Surfaces are wiped down regularly and area disinfected with disinfectant
- Good posture adopted and stool etc. adjusted to achieve a comfortable seating position. Elbows and wrists placed close to microscope
- Regular breaks taken and adequate time is given to students so no rushing is required
- All incidents (cuts, defects etc.) are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised in the use of microscopes
- Students receive safety induction from supervisors and a safety laboratory manual
- Staff are adequately trained and are competent in the use of microscopes
- Hand-washing facilities available in the laboratory
- Sterile wipes are available for cleaning the eyepiece of the microscope

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members and FOCAS Team Members

Target Date/Status: Ongoing

Hazard: Water Baths

Risks

- Burns and scalding from hot water and steam

Control Measures

- Baths are not left unattended and users must stand and not sit in the vicinity of same
- Water in baths is heated slowly to the desired temperature
- Baths are visually inspected prior to use. Damaged water baths are taken out of use immediately

- Spillages are cleaned up immediately
- Baths are allowed to cool before emptying
- All incidents (cuts, defects etc.) are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised in the use of water baths, and do not interfere with or lean over baths
- Materials added to the bath are removed using tongs
- Racks within the bath are not lifted/removed from the bath
- Baths are not overloaded
- Students receive safety induction from supervisors and a safety laboratory manual
- Staff are adequately trained and are competent in the use of water baths
- Hand-washing facilities available in the laboratory

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Glassware

Risks

- Cuts, from damaged or broken glassware e.g. from forcing tubing, teats or bungs into glass tubing, pipettes or condensers which break
- Cuts from flying or ejected pieces of glassware
- Exposure to hazardous substances on contact with containers / receptacles
- Burns from contact with heated glassware

Control Measures

- Spillages are cleaned up immediately

- All incidents (cuts, burns, defects etc.) are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised in the use of glassware
- Students receive safety induction from supervisors and a safety laboratory manual
- Staff are adequately trained and are competent in the use of glassware
- Care is taken in the storage and washing of glassware and specific glassware racks are available in the wash-up area in laboratories
- Hand-washing facilities available in the laboratory
- Use plastic as an alternative to glassware whenever possible
- Glassware is visually inspected before use, glassware with cracks, breakages, scratches, chipped etc. is reported to the supervisor immediately and the glassware is not used
- Glassware is not stored near the edge of work benches in the laboratory
- Great care is taken when using/handling glassware including:
 - Inserting pipettes into pipetting aids or Pasteur pipettes into teats
 - Attaching glass to or removing glass from rubber or plastic tubing
 - Removing "frozen" stoppers from glass bottles
 - Breaking glass tubing; Washing up glassware; Handling broken glassware
- When handling glassware force or excessive pressure should not be applied
- When inserting pipettes into pipetting aids or Pasteur pipettes into teats; attaching glass to rubber or plastic tubing; or removing "frozen" stoppers from glass bottles, glassware should be held in a cloth to help prevent slipping and hands kept as close together as possible
- When fitting glassware to tubing, water or glycerol may be used and the plastic tubing softened by brief immersion in hot water
- Glass vessels under vacuum should be enclosed in plastic or wire mesh to prevent fragments being scattered if implosion occurs
- Hot glassware is treated with care and put in a place of safety so that no individual can access it until it has cooled
- Ground glass connections are lubricated before assembling and disassembled immediately after use
- Flasks or containers are never stoppered when hot
- Where a glass stopper seizes, the container is never heated
- Running is not allowed while carrying glassware
- Broken glassware is carried in suitable cages/trays and placed in the sharps container and never the general waste bin.

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Homogenisers/Batterers

Risks

- Damage or cuts to fingers and hands
- Noise exposure

Control Measures

- Spillages are cleaned up immediately
- All incidents (cuts, burns, defects etc.) are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory

- Students and users are instructed and supervised in the use of homogenisers
- Students receive safety induction from supervisors and a safety laboratory manual
- Staff are adequately trained and are competent in the use of homogenisers
- Hand-washing facilities available in the laboratory
- All homogenisers comply with a relevant CE; EN or BS standard
- All units are serviced and maintained in accordance with the manufacturer's instructions
- Instructions for the use of the homogeniser should be clearly displayed adjacent to the unit
- Homogenisers and their wiring are visually inspected before each use and damaged units reported to management and taken out of use immediately
- The wiring on homogenisers should be checked for damage before every use and damaged units must be removed from service immediately
- Hands and fingers must never be placed into a homogeniser unless it has been disconnected from the power supply first
- When washing the homogenizer blade(s) extreme care must be taken as these can be very sharp. If required gloves should be worn
- When the unit is being used to process material which contains potentially infectious biological agents, appropriate biological containment measures must be taken e.g. by isolating the process within a Biological Safety Cabinet
- When disinfecting homogenizer components care must be taken to select a disinfectant agent that will not corrode or damage the component parts.
- Homogenisers/batterers are started at slow speed and slowly worked up to the operating speed
- Homogenisers/batterers should be operated on the lowest speed setting capable of completing the task
- Where the homogeniser has a lid, it must be used
- The process begins with a small amount of material at first, with additional small amounts being added on an ongoing basis
- PPE including a laboratory coat, safety glasses and gloves are worn
- If noise is near 80dB monitoring can be carried out by The Health & Safety Office

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Hot Plates & Heat Stirrers (Combined)

Risks

- Burns as a result of contact with hot surfaces
- Eye or skin damage as a result of splashing liquid
- Fire as a result of heating materials to high temperatures

Control Measures

- Spillages are cleaned up immediately
- All incidents (burns, defects etc.) are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory

- Students and users are instructed and supervised in the use of hot plates and heat stirrers
- Students receive safety induction from supervisors and a safety laboratory manual
- Staff are adequately trained and are competent in the use of hot plates and heat stirrers
- Hand-washing facilities available in the laboratory
- Hot plates and heat stirrers are visually inspected before each use and damaged units reported to management and taken out of use immediately
- PPE worn includes laboratory coat and safety glasses
- Liquids are heated or stirred in glass or Pyrex vessels only
- Stirrers are turned on only after the container to be heated has been placed onto the plate
- Temperature and rotation speed should be increased gradually to prevent over-heating or splashing
- Flammable liquids must not be heated to a temperature greater than their flashpoints
- If the heating of liquids is likely to release hazardous vapours then the process must be carried out in a fumehood
- Hot plates and heater stirrers are not left unattended when in use
- Ensure that the electrical cable to the unit is not touching the hot plate during use
- Units must be switched off when not in use
- Hot plates must be serviced and maintained in accordance with the manufacturer's instructions
- Hot plates are not handled until they have cooled down. They can remain hot for a period of time. As a result, they must be stored safely so that others are aware they are still hot

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Ultra Violet Light Sources (UV light box) & Trans-illuminator

Risks

- Burns to skin
- Eye damage: buns to cornea resulting in temporary blindness

Control Measures

- Spillages are cleaned up immediately
- A UV face shield is worn when using the light box
- Long sleeves and gloves are worn.
- Risk is reduced because exposure times are low/short
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed

- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Students receive safety induction from supervisors.
- Staff are adequately trained and are competent in the use of the equipment
- Hand-washing facilities available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Stomacher Bags

Risks

- Creation of aerosols
- Exposure to hazardous bacteria
- Slips, trips and falls, and increased risk of exposure as a result

Control Measures

- Spillages are cleaned up immediately
- Gloves are worn.
- All incidents are reported to the supervisor (who is trained in first-aid)
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory

- Students and users are instructed and supervised
- Students receive safety induction from supervisors.
- Hand-washing facilities available in the laboratory

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazards:

Hitachi SU-70 Field Emission Scanning Electron Microscope

Description

The scanning electron microscope (SEM) is a type of electron microscope that images the sample surface by scanning it with a high-energy beam of electrons in a raster scan pattern. The electrons interact with the shells in atoms that make up the sample producing signals that contain information about the sample's surface topography, composition and other properties such as electrical conductivity.

Applications:

Oil, chemical, paper and other forest products, textiles, paint, printing and cement

Risks

- Ionizing radiation from adventitious X-rays: resulting in skin/eye damage, radiation burns, possible long-term damage to health, cancer
- Electrical: electrical burn, electrocution, electric shock, cardiac arrest, death
- Fatigue, incorrect posture etc., leading to tiredness, MSDs etc.
- Trapping, pinching of extremities and/or clothing/long hair into chamber door
- Burns to skin as a result of touching the filament assembly and Peripheral components

Control Measures

- Sample chamber is shielded to stop the escape of any radiation. It is also interlocked, so it cannot be opened when in use
- Ensure user works in normal mode of machine as this gives full protection
- Never try to override the interlock or interfere with the mechanics of the machine
- Operators tie long hair back, ensure lab coat is being worn and any loose clothing is tucked in neatly
- Operators take care when closing chamber door to avoid trapping, pinching extremities
- Operators adopt good postural techniques
- Before any filament replacement work is undertaken, the main unit is turned off and 30 minutes must pass to allow it to cool down sufficiently
- It is not used near water, a sink or in a humid environment
- Plugs are PAT tested annually
- Operators are not allowed to remove the cover from the unit
- Service and maintenance annually by Hitachi
- Defects are reported immediately, the unit taken out of operation and the maintenance company Hitachi contacted
- Only maintenance company Hitachi personnel are authorised to open the electron gun and other components for maintenance purposes. When opening the electron gun and other components the earth leakage breaker and the power must be turned off
- Before commencing maintenance work, the power is turned off and it is unplugged
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Students receive safety induction from supervisors and an instrument risk assessment
- Staff are adequately trained and are competent in the use of the equipment
- Hand-washing facilities available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Asylum MFP-3D-BIO Atomic Force Microscope
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Description

An Atomic Force Microscope (AFM) is a very high-resolution type of Scanning Probe Microscope, AFM, also referred to as SPM or Scanning Probe Microscopy, is a high-resolution imaging technique that can resolve features as small as an atomic lattice in the real space. It allows researchers to observe and manipulate at the molecular and atomic level. The MFP-3D BIO is a high-performance Atomic Force Microscope (AFM) designed specifically for biological applications. It is a versatile AFM that combines molecular resolution imaging and pN force-based measurements on an inverted optical microscope. Combined with its ultra-low noise performance and unprecedented precision and accuracy, the MFP-3D-BIO has raised the bar for AFM instrumentation in bioscience.

Risks

- Electric shock
- Electrocution

Control Measures

- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Students receive safety induction from supervisors and a safety laboratory manual
- Staff are adequately trained and are competent in the use of the equipment
- Hand-washing facilities available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: FOCAS Technical Officers

Target Date/Status: Ongoing

Hazard: Cressington 208C Carbon Evaporation Coating Unit

Description

The Cressington Turbo 208C Carbon Evaporation Coating Unit is a high vacuum coating system designed to evaporate carbon layers onto samples prior to FE-SEM analysis. Advantages of the 208°C include; multiple evaporation capability through a voltage controlled rod source (results are reproducible and efficient), a coating thickness monitor, turbo pump capability which allows for rapid pumpdown and very short coating cycle times). Coatings as low as 0.2nm can be applied to samples and the thickness monitor ensures precision when measuring the amount of carbon deposited. The thickness monitor works on the principle of the quartz crystal microbalance. When evaporated carbon is deposited on the oscillating quartz crystal its frequency is decreased. This change in frequency is then used to calculate the film thickness using the value for carbon density.

Risks

- Exposure to hazardous substances/agents
- Exposure to isopropanol (IPA) (used for cleaning) e.g. drying of the skin as a result of splashes to eyes and skin
- Electrical: electrical burn, electrocution, electric shock, cardiac arrest, death
- Burns as a result of exposure/contact with liquid nitrogen
- Burns as a result of contact with hot parts
- Water leakages from the cooling water supply
- Eye damage as a result of looking at the bright light during the evaporation process

Control Measures

- Operators are trained in manual handling and apply their training e.g. team lifting where necessary
- Isopropanol is a flammable liquid and as a result is never used near hot surfaces. Protective gloves and goggles are also worn during cleaning
- Operators trained in the use of liquid nitrogen, and wear thermally protective gloves and safety glasses
- Operators trained in the use of hazardous chemicals/gases which can be explosive, corrosive, toxic etc. to ensure no reactions between substance and ensure correct storage, use, handling, disposal etc.
- Only company (Cressington) personnel are authorised to install, maintain/service or repair the unit
- Power must be turned off during installation, maintenance/servicing or repair
- Service and maintenance annually twice by company (Cressington)
- Chamber pressure and process current are clearly displayed on the front of the unit
- Manufacturer's instructions are followed at all times
- The coater has safety interlocks to prevent power being switched on with the chamber top plate not in the closed position
- Never try to override the interlock or interfere with the mechanics of the machine
- Operators tie long hair back, ensure lab coat is being worn and any loose clothing is tucked in neatly
- Operators take care when retrieving the sample as the carbon source is very hot. Contact with heated surfaces is avoided
- Operators do not look directly at the bright light during the evaporation process (part of the coating process)
- Care is taken with water and electrical cables
- Plugs are PAT tested annually
- Defects are reported immediately, the unit taken out of operation and the maintenance company (Cressington) contacted
- Before commencing maintenance/repair work, the power is turned off and it is unplugged
- Water pipes are checked regularly to ensure no leaks
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised and risk assessment
- Staff are adequately trained and are competent in the use of the equipment
- Hand washing facilities are available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Cressington 208HR Sputter Coater

Description

The Cressington 208HR Sputter Coating Unit is a high vacuum coating system designed to sputter a range of metals onto samples prior to FESEM imaging. As coatings can interact with different sample surfaces in different ways, the apparent grain size of the coating can vary between samples. In order to minimise this issue, a range of metals and alloys can be used depending on sample type. Imaging of non-conducting materials requires coating the sample in Au/Pd or Pt/ Pd, whilst semi-conducting samples can be sputtered with a very thin Cr layer. As thin layers require a long working distance and thick layers a long working distance, the 208HR coating unit comes with varying glass heights to facilitate working distance requirements. Also, the precise control of both conformity and uniformity of the coating can be regulated due to the wide range of operating pressures available as well as correct utilisation of the thickness controller.

Risks

- Exposure to isopropanol (IPA) (used for cleaning) e.g. drying of the skin as a result of splashes to eyes and skin

- Electrical: electrical burn, electrocution, electric shock, cardiac arrest, death
- Gas leaks from gases such as nitrogen, helium and argon
- Burns as a result of exposure/contact with liquid nitrogen
- Burns as a result of contact with hot parts
- Water leakages from the cooling water supply
- Eye damage as a result of looking at the bright light during the evaporation process

Control Measures

- Operators are trained in manual handling and apply their training e.g. team lifting where necessary
- Isopropanol is a flammable liquid and as a result is never used near hot surfaces. Protective gloves and goggles are also worn during cleaning
- Gas supply (nitrogen, helium and argon) used in operation of the unit are kept to the lowest pressure and flow rate feasible to minimise effects of leaks
- Operators trained in the use of liquid nitrogen, and wear thermally protective gloves and safety glasses
- Only company (Cressington) personnel are authorised to install, maintain/service or repair the unit
- Power must be turned off during installation, maintenance/servicing or repair or when connecting or disconnecting any parts
- Service and maintenance annually by company (Cressington)
- Chamber pressure and process current are clearly displayed on the front of the unit
- Manufacturer's instructions are followed at all times
- The coater has safety interlocks to prevent power being switched on with the chamber top plate not in the closed position
- Never try to override the interlock or interfere with the mechanics of the machine
- Operators tie long hair back, ensure lab coat is being worn and any loose clothing is tucked in neatly
- Operators take care when retrieving the sample as the carbon source is very hot. Contact with heated surfaces is avoided
- Operators do not look directly at the bright light during the evaporation process (part of the coating process)
- Care is taken with water and electrical cables
- Plugs are PAT tested annually
- Defects are reported immediately, the unit taken out of operation and the maintenance company Hitachi, UK contacted
- Before commencing maintenance/repair work, the power is turned off and it is unplugged
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Staff are adequately trained and are competent in the use of the equipment
- Hand washing facilities are available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: **Ongoing**

Hazard: Spray Painting

Risks

- Respiratory irritation from inhalation of fumes, vapours or fine mist
- Skin irritation from contact with spray mist

Control Measures

- Spray painting is carried out in designated booths with extract ventilation
- Spray booth is used and maintained in accordance with manufacturer's instructions
- Spray booths are installed, maintained/serviced/repaired etc. by a competent person
- Least hazardous paints are used where possible
- Spray booth is operated at a slightly lower pressure than the surrounding areas (negative pressure)
- Spray booth clearance times are set and are posted at spray booth access point
- Access is prevented to the spray booth during baking operations
- Safety Data Sheets (SDS) available for substances used
- Hand-washing facilities provided
- No eating or drinking in laboratories and workshops

- Suitable PPE, including full body protection and air-fed breathing apparatus is provided and worn
- Signage in place for PPE required
- Information and training provided to students by staff
- Driving of vehicle into spray booth performed by technicians only
- Ramp installed to assist in vehicle entering/exiting spray booth
- Spray booth filters are handled and disposed of by technicians using hazardous waste bag
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Students receive safety induction from supervisors and a safety laboratory manual
- Staff are adequately trained and are competent in the use of the equipment
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Further Control Measures

- Develop SOP for spray painting operations
- Inspection and maintenance programme for spray booth, ventilation system and PPE
- Occupational hygiene monitoring to be carried out
- Ensure health surveillance is provided where necessary

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Power Tools (including hand tools)

List items used e.g.

- Mechanical drills
- Grinders including angle grinders
- Sanders
- Polishers
- Buffers
- Hoover
- Abrader

Risks

- Burns
- Entanglement
- Eye injuries
- Cuts
- Amputation
- Trauma from ejected materials/flying particles
- Vibration

- Noise
- Contact with moving parts

Control Measures

- Power tools used and maintained in accordance with manufacturer's instructions
- Equipment is CE marked and comes with CE certificate of conformity
- Power tools visually checked before each use
- Defects reported and faulty/damaged tools taken out of use
- Power tools are (installed), maintained/serviced/repaired etc. by a competent person
- Safety guards provided and used
- First-aid kit provided
- Mandatory training for staff in one day Emergency First-aid course
- Information and training provided in safe use of power tools
- Adequate lighting to ensure good visibility for work tasks
- PPE provided and worn as required
- Vice/clamps provided and used as required to secure work pieces
- Ensure no loose or dangling clothing/personal effects when operating power tools with moving/rotating parts
- Isolate power before making adjustments or changing accessories
- Power tools greater than 110 volts are not used in external or damp locations
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Staff are adequately trained and are competent in the use of the equipment
- Hand-washing facilities available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Further Controls

- SOP to be developed for each power tool
- PAT testing to be carried out as appropriate

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Manually Operated Hand Tools/Tools

List items used e.g.

- Hammers
- Hacksaws
- Guillotines
- Pliers
- Screwdrivers
- Allen Keys
- Torque Wrench
- Chisels

Risks

- Cuts and lacerations
- Bruises
- Blunt trauma/impact
- Eye injuries

Control Measures

- Hand tools kept clean, sharp and in good condition
- Hand tools visually checked before each use
- Defects reported and faulty tools taken out of use
- First-aid kit provided
- Mandatory training for staff in one day Emergency First-aid course
- Information and training provided in safe use of hand tools
- Supervision of students by staff
- Adequate lighting to ensure good visibility for work tasks
- PPE provided and worn as required
- Edges of sharp hand tools protected/sheathed when not in use and when being carried
- Hand tools stored safely when not in use
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Staff are adequately trained and are competent in the use of the equipment
- Hand-washing facilities available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Rotary Evaporator

Risks

- Release of evaporator contents
- Burns or scalds due to contact with hot water, steam or the water bath
- Organic solvent fire
- Breakage of apparatus due to build-up of pressure including flying glass
- Implosion upon application of vacuum
- Electrocution from electrical components

Control Measures

- Rotary evaporators are visually inspected before each use and damaged units reported to supervisor. Damaged units are not be used until they have been examined by a competent person. Users are vigilant for cracks in glassware
- The condenser of the rotary evaporator is shielded where possible using a plastic mesh or similar
- Dreschel bottles must not be used as vacuum traps
- Cracked flasks must not be used
- Operators must ensure that they empty and clean the solvent collection flask prior to use.
- Operators must ensure that a good vacuum has developed in the apparatus before spinning the sample to prevent the flask falling off

- Users must not hold onto the sample flask when it is rotating
- The reintroduction of air back into the system after an evaporation has been completed must be done slowly and with care
- The unit should be cleaned after use
- All evaporators must be serviced and maintained in accordance with the manufacturer's instructions
- Units are (installed), maintained/serviced/repared etc. by a competent person
- Service and maintenance by company (Mason Technology).
- PPE used/worn: lab coat and safety glasses. A pair of heavy gloves should be available
- Do not leave rotary evaporator switched on when unattended. Avoid contact with the water bath or the steam from it
- Ensure that the apparatus is electrically checked on an annual basis and is maintained in good working order
- Always check for blockages during the experiment
- Organic solvents and residues kept away from the hot water bath/electrical components
- Avoid heating the water bath or contents to too high a temperature
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Students receive safety induction from supervisors and a safety laboratory manual.
- Staff are adequately trained and are competent in the use of the equipment
- Hand-washing facilities available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Thermal Analysis

Risks

- Release of gases from contents/samples
- Burns or scalds
- Eye injuries
- Fire
- Electrocution from electrical components

Control Measures

- Units have a safety interlock and will not open until the temperature is below 50°C.
- Units are visually inspected before each use and damaged units reported to supervisor. Damaged units are not be used until they have been examined by a competent person
- Care is taken when opening the cabinet due to the possibility of steam
- All units must be serviced and maintained in accordance with the manufacturer's instructions
- PPE used/worn includes a lab coat and safety glasses
- Do not leave units switched on when unattended
- Units are (installed), maintained/serviced/repared etc. by a competent person
- Service and maintenance annually by company (Trilogica Service, Germany).
- Ensure that the apparatus is electrically checked on an annual basis and is maintained in good working order
- Always check for blockages during the experiment

- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Students receive safety induction from supervisors and equipment risk assessment.
- Staff are adequately trained and are competent in the use of the equipment
- Hand-washing facilities available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Humidity Cabinet (SO₂ Cabinet) : Not in service

Risks

- Release of gases from contents/samples
- Burns or scalds from steam
- Eye injuries
- Fire
- Electrocution from electrical components

Control Measures

- Units are visually inspected before each use and damaged units reported to supervisor. Damaged units are not be used until they have been examined by a competent person
- Care is taken when opening the cabinet due to the possibility of steam
- All units must be serviced and maintained in accordance with the manufacturer's instructions
- PPE used/worn includes a lab coat and safety glasses
- Do not leave units switched on when unattended
- Units are (installed), maintained/serviced/repared etc. by a competent person
- Ensure that the apparatus is electrically checked on an annual basis and is maintained in good working order
- Always check for blockages during the experiment
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory

- Students and users are instructed and supervised
- Students receive safety induction from supervisors and a risk assessment, equipment manual
- Staff are adequately trained and are competent in the use of the equipment
- Hand-washing facilities available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Compressed Air

Risks

- Explosion
- Lacerations
- Eye injuries
- Internal injuries
- Skin damage
- Hearing damage

Control Measures

- Compressed air system is installed, used and maintained in accordance with manufacturer's instructions
- Use of compressed air for blowing dirt or dust from clothing or skin is prohibited
- Air receiver has suitable safety devices and correct pressure gauge fitted and a unique identification mark and safe working limits displayed on it
- Suitable protective devices are fitted to the system and adjusted by a competent person
- Safety valves and bursting discs are located so that they discharge to a safe place
- Airline has a dead man's handle and pressure gauge fitted where relevant
- Flexible air lines are securely stored when not in use
- Inspection and maintenance programme for compressed air system and airlines
- Equipment checked before use, defects reported and unsafe equipment is taken out of use
- Appropriate PPE, including eye and hearing protection, is provided and worn
- Supervision of students by staff
- Warning signs in place

- Mandatory training programme for staff in one day Emergency First-aid
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Students receive safety induction from supervisors and equipment risk assessment
- Staff are adequately trained and are competent in the use of the equipment
- Hand-washing facilities available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Further Control Measures

- Maintain current controls
- Develop SOP for compressed air system

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

Hazard: Ovens/Furnaces

Risks

- Burns to hands and arms
- Eye injury
- Personal injury
- Slips, trips and falls from oven/furnace to cooling area
- Fire
- Release of toxic chemicals/substances

Control Measures

- Ovens/furnaces are visually inspected before each use and damaged units reported to the supervisor. Damaged units must not be used until they have been examined by a competent person. Doors must be capable of closing properly and the thermostat must be functioning properly
- Oven plugs should be labelled as to the unit that they power, and should be easy to access in an emergency
- Allow materials from ovens to cool before removing. If required thermal gloves should be worn
- Ensure that the temperature at which the oven is set is compatible with the material being heated in the oven, e.g. if placing plastic material in the oven the temperature must be set below the plastic melting point
- Ovens must not be used to dry or heat any samples that have a flammability risk
- Ovens must not be used to heat any samples that may give rise to toxic or corrosive fumes unless the oven is vented suitably
- All ovens must be serviced and maintained in accordance with the manufacturer's instructions

- Ovens/furnaces are (installed), maintained/serviced/repaired etc. by a competent person
- User stands to one side of furnace door when opening
- Safety glasses and lab coat worn
- Tongs used to remove crucibles/containers from furnace or to transfer to desiccators
- Ensure pat to cooling area is free from obstructions
- Sleeves of lab coat are always rolled down covering arms
- Mandatory training programme for staff in one day Emergency First-aid
- All incidents are reported to the supervisor (who is trained in first-aid) and an incident report form completed
- Trained first-aiders, a first-aid kit and an eyewash station are available in the laboratory
- Students and users are instructed and supervised
- Students receive safety induction from supervisors and the equipment risk assessment.
- Staff are adequately trained and are competent in the use of the equipment
- Hand-washing facilities available in the laboratory
- Visual inspection takes place before each use and damaged units reported to management and taken out of use immediately

Risk: H/M/L:

With current controls: L

With actions applied: L

Person(s) Responsible: CREST Team Members

Target Date/Status: Ongoing

The list of equipment risk assessments are in Table 1 and stored in the CREST I drive.

APPENDICES

Appendix 1: Laboratory Safety Rules

1. Lab coats must be worn buttoned up
2. Safety glasses must be worn when handling hazardous chemicals or when you are instructed to do so by staff
3. Open toed shoes/sandals are not allowed in the laboratories
4. Food, chewing gum or drink must not be consumed in laboratories
5. Make up, lip balm etc must not be applied in laboratories
6. Personal items should not be stored in lab coat pockets
7. Lab coats must not be worn outside labs
8. Mouth pipetting is prohibited
9. Broken or damaged glassware must be disposed of in the sharps bin
10. Winchesters must not be carried by the neck
11. Long hair must be tied back.
12. Horseplay, practical jokes and running are strictly prohibited in laboratories
13. All chemicals must be labelled with the chemical name (s) and hazard warning label at a minimum
14. All accidents must be reported to the member of staff on duty

Appendix 2: List of SOP's

List of SOP's							
03-001 CREST Staff Appraisal				11-009 SU-70			
04-002 Control of CREST Project File Information				11-014D Determination of Contrast Ratio (Opacity)			
04-003D Literature Review and Journal Articles Electronic Storage				11-015D ATD to GCMS			
05-001 Control of Documents & Records Procedure				11-016D Operation of BET Analyser			
05-004 Electronic Backup of Data				11-017D Operation of EDX			
08-001 Customer Property				11-018D Operation of Carbon Evaporation Coater 208C - Master Copy - Rev B			
09-001 Completion & Archival of Quality Records				11-019D Operation of Sputter Coater 208HR			
09-005 Direct Consultancy				13-001 Control of Non Conforming Product			
11-001 External DIT Instrument Use				14-001 Corrective and Preventive Action Procedure			
11-002 Operation of Dispermat				14-002 Customer Complaints			
11-003 EIS Solartron				17-001 Quality System Management Review Procedure			
11-004D Operation of Humidity Cabinet Memmert HCP 246				17-002 Internal Audit Procedure			
11-005 Operation of XRD				18-001 Training and Competence of CREST Employees			
11-006D Contact Angle				18-002 New Employee Induction			
11-007D DSC				50-001 Use of Personal Protective Equipment at CREST			
11-008D TGA				50-002 Risk Assessment & MSDS Storage			
				50-004 Ordering Chemicals Procedures			

Appendix 3: Guidelines on Appropriate Disinfection Products

The following are guidelines on appropriate disinfectants;

Chlorox (hypochlorite/

Presept tablets)

2.5% for discard jars

1% for microbial spillages

10% for blood

Not to be used for large amount of organic matter or metals

Stericol (phenolic)

2% for organic matter

Virkon

metals and instruments

Industrial Methylated Spirits

90% for swabbing benches before and after practical classes

It is the responsibility of Technical Staff to ensure that equipment is decontaminated prior to servicing.

Appendix 4: Chemical Incompatibilities

Chemical	Is Incompatible With
Acetic acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides, permanganates.
Acetylene	Chlorine, bromine, copper, fluorine, silver, mercury
Acetone	Concentrated nitric and sulphuric acid mixtures
Alkali and alkaline earth (e.g. powdered aluminium or magnesium, calcium, lithium,	Water, carbon tetrachloride or other chlorinated metals hydrocarbons, carbon dioxide, halogens.

sodium, potassium).	
Ammonia (anhydrous)	Mercury (e.g. in manometers), chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid (anhydrous)
Ammonium nitrate	Acids, powdered metals, flammable liquids, chlorates, nitrates, sulphur, finely divided organic or combustible materials.
Aniline	Nitric acid, hydrogen peroxide
Arsenical materials	Any reducing agent
Azides	Acids
Bromine	See Chlorine
Calcium oxide	Water
Carbon (activated)	Calcium hypochlorite, all oxidising agents
Carbon tetrachloride	Sodium
Chlorates	Ammonium salts, acids, powdered metals, sulphur, finely divided organic or combustible materials
Chromic acid and chromium trioxide	Acetic acid naphthalene, camphor, glycerol, alcohol, flammable liquids in general
Chlorine	Ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gasses), hydrogen, sodium carbide, benzene, finely divided metals turpentine
Chlorine dioxide	Ammonia, methane, phosphine, hydrogen sulfide
Copper	Acetylene, hydrogen peroxide
Cumene hydroperoxide	Acids (organic or inorganic)
Cyanides	Acids
Flammable liquids	Ammonium nitrate, chromic acid hydrogen peroxide, nitric acid, sodium peroxide, halogens
Fluorine	Everything

Chemical	Is Incompatible With
Hydrocarbons (e.g. butane, propane, benzene)	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrocyanic acid	Nitric acid, alkali
Hydrofluoric acid (anhydrous)	Ammonia (aqueous or anhydrous)
Hydrogen peroxide	Copper, chromium, iron, most metals or their salts, alcohols, acetone, organic materials, aniline, nitromethane, combustible materials
Hydrogen sulfide	Fuming nitric acid, oxidizing gases
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous or anhydrous) hydrogen
Mercury	Acetylene, fulminic acid, ammonia
Nitrates	Sulphuric acid
Nitric acid (concentrated)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, copper, brass, any heavy metals
Nitrates	Acids
Nitroparaffins	Inorganic bases, amines
Oxalic acid	Silver, mercury
Oxygen	Oils, grease, hydrogen, flammable liquids, solids or gases
Perchloric acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood, grease, oils
Peroxides, organic	Acids (organic or mineral) avoid friction, store cold

Phosphorus (white)	Air, oxygen, alkalis, reducing agents
Phosphorus pentoxide	Water
Potassium	Carbon tetrachloride, carbon dioxide, water
Potassium chlorate	Sulphuric and other acids
Potassium perchlorate (see also chlorates)	Sulphuric and other acids
Potassium permanganate	Glycerol, ethylene glycol, benzaldehyde, sulphuric acid
Selenides	Reducing agents
Silver	Acetylene, oxalic acid, tartaric acid, ammonium compounds, fulmonic acid
Sodium	Carbon tetrachloride, carbon dioxide, water

Chemical	Is Incompatible With
Sodium nitrate	Ammonium nitrate and other ammonium salts
Sodium peroxide	Ethyl or methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfides	Acids
Sulfuric acid	Potassium chlorate, potassium perchlorate, potassium permanganate (similar compounds of light metals, such as sodium, lithium)
Tellurides	Reducing agents

Appendix 5: Spills Procedure

General

1. Wear lab coat, gloves and safety glasses when cleaning up spillages
2. Clear other staff or students from the area
3. Open windows
4. Spill kits are available in each lab
5. Do not dispose of waste in yellow bags

Small spills

Wipe up spill with a disinfectant-soaked paper towel and clean the surface with a suitable disinfectant.

Large spills inside the laboratory

1. If a spill occurs, notify other individuals in the laboratory to evacuate.
2. Exit the laboratory, closing the door behind you.
3. Remove any contaminated clothing and place it in an autoclave bag.
4. Wash all exposed skin.
5. Place signs on door(s) to the laboratory warning individuals who may want to enter that a spill occurred and access is denied.
6. Allow aerosols to settle for 30 minutes before re-entering the laboratory.
7. Assemble supplies (disinfectant, sharps containers, towels, tongs, autoclave bags, etc.) before entering the laboratory.
8. Don appropriate personal protective equipment (i.e. disposable gown, protective eyewear, gloves, shoe coverings and respiratory protection if needed).
9. Clean up spill with a suitable disinfectant as follows:
 - a. Surround spill area with disinfectant or diking material that is soaked in disinfectant.
 - b. Place paper towels soaked in a disinfectant over the entire spill area.
 - c. Allow 20 minute contact time with the disinfectant to ensure adequate germicidal action.
 - d. Wipe down non-autoclavable materials with germicidal disinfectant.

- e. Place items designated as *contaminated used sharps* in a sharps container. Place other disposable materials used in the cleanup process in an infectious waste bag. Process as infectious waste.
 - f. Place contaminated re-usable items in biohazard bags or autoclavable containers. Sterilize, preferably by autoclaving, then clean for re-use.
 - g. Remove protective clothing used during cleanup and place in a biohazard bag for autoclaving.
 - h. Wash hands whenever gloves are removed.
10. Notify the Head of CREST

Large spills inside a centrifuge

The potential for multiple infections from a single centrifuge accident is great. Aerosols are created when fluid escapes from the rotor or cup while the centrifuge is operating at high speed. All opening of centrifuges must be performed slowly.

1. If a centrifuge tube breaks while the centrifuge is running, turn off motor. Allow the machine to be at rest for 30 minutes before opening. **DO NOT OPEN THE CENTRIFUGE.**
2. If breakage is discovered after the machine has stopped, re-close the lid immediately and allow the unit to be at rest for 30 minutes. Have all personnel leave the lab before initiating clean up and disinfection.
3. Gloves must be worn for cleaning up breakage. Forceps and cotton swabs must be used to remove all glass debris which is then placed directly into sharps container for incineration. Unbroken, capped tubes may be recovered using forceps and decontaminated using disinfectant. (Chlorox).
4. Centrifuge bowl should be swabbed out with Glutaldehyde (cidex 2%) and rinsed with water. Buckets etc. must be steeped in cidex for 10 minutes, rinsed with water and dried.

Acid spills

1. Apply neutraliser (or sodium bicarbonate) to the perimeter of the spill
2. Mix thoroughly until fizzing and evolution of gases ceases. It may be necessary to add a small amount of water to the mixture to complete the reaction as neutraliser has a tendency to absorb acid before fully neutralising it. Do not add the water first
3. Check with pH indicator paper that the acid has been neutralised
4. Transfer the mixture to a strong plastic bag, tie shut and label.
5. Place in a fume hood until disposal can be arranged

Caustic spills

1. Apply neutraliser to the perimeter of the spill
2. Mix thoroughly until fizzing and evolution of gases ceases
3. Check with pH indicator paper that the acid has been neutralised
4. Transfer the mixture to a strong plastic bag, tie shut and label
5. Place in a fume hood until disposal can be arranged

Solvent spills

1. Apply activated charcoal to the perimeter of the spill
2. Mix thoroughly until material is dry and no evidence of liquid solvent remains
3. Transfer absorbed solvent to a plastic bag (if compatible), tie shut and label
4. Place in a fume hood until disposal can be arranged

Appendix 6: Procedure in the event of a Needle stick/Sharps Injury

Procedure in the event of a needlestick/sharps injury

When correct procedures are followed needlestick injuries should not occur. If a needlestick injury, or other percutaneous exposure to blood occurs bleeding of the wound should be encouraged

under running water. The area should be covered with a waterproof plaster. If the needle or sharp was unused and not in contact with blood no further action needs to be taken. If the needle or shard was contaminated with blood the following additional action must be taken:

- 1) Immediately report the injury to the Occupational Health Officer/Student Health Centre and Head of CREST (Refer 4.9 Accidents, Incidents & Near Miss Reporting & Investigation)
- 2) A Clinician must decide whether any follow up is called for in relation to Hep B, Hep C or HIV

Exposure Follow-ups

- Even when precautions are followed an accidental exposure may occur. If an exposure occurs, administer first-aid if needed. In the event of a major injury, contact the emergency services on 999/112. Inform the emergency services that exposure to a group 2 biological agent has occurred as well as the injury.
- If it is not a major injury, wash the contaminated area thoroughly with soap and water. A splash to the face should be flushed thoroughly with water. If the material or substance involved in the exposure can be identified do not dispose of it. It may be possible to test the material for pathogens.
- Notify Head of CREST of the exposure so any necessary medical follow-up may be implemented.
- When the immediate needs of the patient have been met, the appropriate accident documentation must be completed.

Appendix 7: SOP in Obtaining Blood Samples

1. The disease status of blood samples is unknown.
2. If there is any reason to believe that the subject has a blood disorder, then blood samples should not be taken.
3. Exclude taking blood from any student or staff with obvious open wounds or lacerations on the hands. During experimental work wounds and lacerations should be covered by a waterproof plaster.
4. Set out the tray with equipment as follows:
 - stilette or syringe and needle
 - sterile swab (mediprep or similar chlorhexidine acetate 0.2% and cetrimide 3%)
 - cotton wool
 - adhesive plaster
 - rigid container for disposal of all used soiled items
5. Wash hands with soap and water using a nail brush if necessary.
6. Label the slide or tube.
7. Place a disposable paper towel below the site of intended puncture.
8. Swab the site of the puncture, and dispose of the swab in the yellow sharps container.
9. Obtain the sample. Swab off excess blood and dispose of the swab in the yellow sharps container when bleeding has stopped.
10. Any spillage of blood onto surfaces should be cleaned by using a 1:10 dilution of bleach.
11. Dispose of the stilette, syringe and needle (without resheathing the needle) into the yellow sharps container. This should be sealed before it becomes full to avoid injuries from forcing sharps into a full box. The sharps box should be included in the clinical waste when sealed.
12. Any blood contaminating the operator should be washed off immediately using soap and water.
13. Should the operator puncture him/herself and consider that he/she has been contaminated, then he/she should encourage local bleeding and wash immediately with hot water and soap.
14. Following the procedure, wash and dry hands.

Appendix 8: Groups A & B

Group 1-A Bases <i>Potential consequences: Heat generation; violent reaction</i>	Group 1-B Acids
Group 2-A Aluminium Beryllium Calcium Lithium Magnesium Potassium Sodium Zinc powder Other reactive metals and metal hydrides <i>Potential consequences: Fire, Explosion, or generation of flammable hydrogen gas.</i>	Group 2-B Any Acid or Bases
Group 3-A Alcohols Water <i>Potential consequences: Fire, Explosion, or heat generation: generation of flammable or toxic gases.</i>	Group 3-B Any Concentrated Acids or Bases Calcium Lithium Magnesium Sodium Zinc Powder Any Reactive Metals and Metal Hydrides Potassium Sulfonyl chloride Thionyl chloride Phosphorus trichloride Methyl trichloride Methyl trichlorosilane Other water-reactive waste
Group 4-A Alcohols Aldehydes Halogenated hydrocarbons Nitrated hydrocarbons Unsaturated hydrocarbons Other organic compounds and solvents <i>Potential consequences: Fire, Explosion, or violent reaction.</i>	Group 4-B Any Concentrated Acids or Bases Reactive Metals and Metal Hydrides
Group 5-A Cyanide's and sulphide's <i>Potential consequences: Generation of toxic hydrogen cyanide or hydrogen sulphide gas.</i>	Group 5-B Any Acids
Group 6-A Chlorates	Group 6-B Acetic acid and other organic acids

Chlorine Chlorites chromic acid Hypochlorites Nitrates Nitric acid, fuming Perchlorates Permanganates Peroxides Other strong oxidizers <i>Potential consequences: Fire, Explosion, or violent reaction.</i>	Concentrated mineral acids Reactive Metals and Metal Hydrides Organic Compounds and Solvents Other flammable and combustible chemicals
The following two groups are added to facilitate the economical disposal of the wastes. They are not necessarily reactive.	
<u>Group 7-A</u> Heavy metal Compounds containing arsenic, barium, cadmium, chromium, lead, selenium, silver Polychlorinated biphenyls (PCBs) Dioxins Mercury Containing Compounds	<u>Group 7-B</u> Flammable Liquids
<u>Group 8-A</u> Polychlorinated biphenyls (PCBs) Dioxins Mercury Containing Compounds	<u>Group 8-B</u> All other chemicals and each other