

UNIVERSITY OF
BIRMINGHAM

**School of Electronics, Electrical & Computer
Engineering
And
Gisbert Kapp**



Health and Safety Policy Document

September 2010

**Gisbert Kapp is a NO SMOKING building
No smoking within 10 metres of doorways and
windows**

**No eating or drinking in Teaching, Seminar or
rooms, computer suites or laboratories**

**Organised functions, however, may be undertaken in Seminar rooms
with prior consultation with Ben Clarke, UG Office, Room N126**

**All electrical equipment must have a valid test
certificate sticker**

This includes personal equipment brought into the building.

**All practical work must have a valid Risk
Assessment, reviewed every 12 months**

Toasters are NOT allowed in the building.

**Bikes should be secured in provided locations
only**

**Under 18's should only be in the buildings with
permission of Head of School**

**Normal working hours are
08:00 to 18:00, Monday to Friday. Not including
'closed' days**

**Outside of these times, admission is granted via
swipe. This is a privilege, not a right.**

Please sign the out of hours register when entering and leaving the building out of hours

N418 is a designated eating and drinking area

HEALTH AND SAFETY POLICY DOCUMENT

REVISION DATE : September 2010

Always use the latest copy of these Health and Safety Notes.

*The latest copy can be found and printed from the Technical Services web site in
Adobe PDF Format*

<http://www.eee.bham.ac.uk/techsupp>
In addition it can be found on WEBCT

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HEALTH AND SAFETY POLICY STATEMENT

Within this document :

- The term College refers to the College of Engineering and Physical Science
- The term School refers to "Electronic, Electrical & Computing" and additionally any other work/business carried out in the Gisbert Kapp building

In line with the University's Safety Policy, the College is committed to providing and maintaining a safe working environment for Staff, students and others in the building on College business.

In order to achieve the above the College has the following objectives:

- as a minimum, to comply with relevant legislation;
 - to comply with University health and safety policy;
 - to identify hazards, and assess and control the risks;
 - to ensure that staff, students and others are adequately informed of the identified risks and receive, where appropriate, instruction, training and supervision.
-
- to monitor and review the effectiveness of the College's arrangements and where appropriate implement adjustments and/or improvements;
-
- to provide good lines of communications to ensure that health and safety concerns can be raised and dealt with.
-
- Whilst the Head of School accepts the main responsibility for implementation of this Policy, individuals have an important role in co-operating to ensure a healthy and safe working environment and are required to abide by the Rules and Requirements of the Policy.

HEALTH AND SAFETY MANAGEMENT

COLLEGE LEVEL

- Head of College is responsible for ensuring compliance with Health and Safety Policy .
- Head of College will establish a Health and Safety Management Structure to ensure health and safety policy is implemented, monitored and updated; hazards and risks identified and controlled; and records kept.
- Head of College will appoint a Safety Officer and School Safety Co-ordinators (accredited by the Health and Safety Unit), a Safety Committee, Student Welfare Officer, First Aiders and Fire Wardens.
- The Safety Committee will consist of Safety Co-ordinator from each School
- The Safety Committee will advise Head of College on compliance with relevant health and safety legislation.
- The Safety Committee will review College safety performance and compliance with health and safety policy and recommend modifications as appropriate.

SCHOOL LEVEL

- The School Safety Co-ordinator will act on behalf of the Head of School in being responsible for the effectiveness of health and safety arrangements, dissemination of information and arrangements for training.
- The School Safety Co-ordinator will monitor safety performance, carry out Health and Safety Inspections, arrange Fire Drills, advise and assist personnel on individual safety matters and generally encourage a healthy and safe attitude to working.
- The School Safety Co-ordinator will liaise as appropriate with the Health and Safety Unit
- The Head of School will chair a School Health and Safety Committee who's membership will consist of
 - The Head of School
 - The School Safety Co-ordinator
 - The trades Union representative
 - Nominated members representing the School

DISSEMINATION OF COLLEGE SAFETY POLICY AND INFORMATION

In recognition of the College's large throughput of personnel, this Health and Safety Policy Document is distributed as follows:

- a) **NEW STAFF:** from the Schools Personnel Officer upon arrival

- b) **POSTGRADUATE RESEARCH AND TAUGHT MSc STUDENTS:** from the Postgraduate Office upon arrival.

- c) **UNDERGRADUATE STUDENTS:** from the Undergraduate office each year as part as their special points handout

This Safety document will be reviewed and updated annually. Other relevant safety information will be distributed as it becomes available.

Reference copies are available via the Technical Services web site at address <http://www.eee.bham.ac.uk/techsupp>

The Health and Safety document found at the above web address will always be the definitive and most up to date version.

General health and safety talks will be given to all personnel.

ALL PERSONNEL ARE REQUIRED TO FAMILIARISE THEMSELVES AND COMPLY WITH THIS HEALTH AND SAFETY POLICY DOCUMENT

What follows in the remainder of this Safety Document is not intended to be exhaustive. It is meant to make the individual, whatever their role in the School, aware of their responsibility in making our working environment as risk free as practical. It is also a guide to relevant legislation and regulations, and what is required to create effective risk control measures.

Further information regarding particular health and safety issues is available from either within the School or the University or from HMSO.

The best way of solving a health and safety problem is not to let it become a problem in the first place. And the best way of achieving that is to consult with the School Safety Co-ordinator as early as possible.

As part of College Health and Safety Policy, this document will be reviewed and updated annually as appropriate.

EMERGENCY EVACUATION

Emergency evacuation instructions are posted adjacent to fire alarm points and on notice boards throughout the building. (See appendix 1)

Fire wardens have been appointed to assist evacuation. Their instructions must be obeyed. (See appendix 2)

All staff are to receive basic training in the use of fire extinguishers.

The School will have an evacuation drill once every year. This will be during term time to involve the undergraduates.

ACCIDENTS

All accidents and incidents (near misses) involving students, employees or other people connected with School business are to be reported (with minimum delay) to the Safety Co-ordinator.

Statutory report forms will be completed by the Safety Co-ordinator and copied to the Safety Unit and University Insurance Office. The Safety Unit will inform the enforcing authority (HSE or Local Authority) as/if required under the Reporting of Injuries, Diseases and Dangerous Occurrence Regulations (RIDDOR).

Accidents and incidents will always be investigated by the Safety Co-ordinator. Dependant upon the seriousness, the Safety Unit and/or enforcing authority may also investigate. Measures to prevent similar occurrences will be actioned as necessary.

Note: the reporting of accidents applies to personnel on School business whether on or off the premises (i.e. fieldwork etc.).

1st AIDERS

The School has several qualified 1st Aiders. In the case of injury, they are the first point of contact. Their names, telephone numbers and locations (See appendix 3)

David Checkley	N206 Gisbert Kapp	4 3964
Andrew Roche	N321 Gisbert Kapp	4 3130
Samantha McCauley	N131 Gisbert Kapp	4 4319
Ethelinde Deer	N134 Gisbert Kapp	4 4297
Mary Winkles	N130 Gisbert Kapp	4 4292
Katrina Gallant	N334 Gisbert Kapp	4 4318
Debbie Jones	S409 52 Pritchatts Rd	4 8380
Derek Kyte	S111A 52 Pritchatts Rd	5 8502
Emma-Jane Petherick	S 204 52 Pritchatts Rd	5 8592

OUT OF HOURS USE OF THE BUILDING

Normal Working Hours are: 8.00am - 6.00pm Weekdays

STAFF ACCESS

Staff holding valid security passes (generally academic and selected support staff) are permitted out of hours access for the purposes of School business.

POSTGRADUATE ACCESS

Research Associates, Research Follows and Postgraduate Students holding valid security passes are permitted access to those areas specifically associated with their research activities. Restrictions to security passes apply.

UNDERGRADUATE ACCESS

Undergraduate Students associated with the School are permitted access to the ground floor Computer Suite and Learning Resource Centre until 12 midnight on weekdays and weekends for the purposes of their studies.

Exceptions for special circumstances may be granted with the joint approval of the Head of Undergraduate Division and the Safety Co-ordinator.

CONDITIONS OF ACCESS

Security Pass holders are required to sign the *Out of Hours Register* on entering and leaving the building. This information is vital for Fire Officers in the event of an emergency. Pass holders are also required to obey any instructions given by University Security Officers or Fire Officers.

Note..

Out of hours access is a privilege not a right and is subject to compliance with School Health and Safety Policy as outlined in this document. Breaches may result in the withdrawal of that privilege. (See section on *Responsibility of Individuals and Supervision*).

In addition: Access is subject to individuals neither compromising the security nor contents of the building.

BUILDING SERVICES

Building services, water, gas, electricity etc. are the responsibility of the University and not the School. They may only be maintained or modified by competent personnel from Estates Management.

No one within the School is deemed competent.

HEALTH AND SAFETY INSPECTIONS

- The entire building will be inspected once a year.

- High risk areas, such as laboratories and workshops will be inspected six monthly. (This may be more frequent according to the level of risk.)

- In areas considered to be low risk, such as offices and computer rooms a twelve monthly inspection is considered to be adequate.

THE INSPECTION TEAM WILL COMPRISE:

- The School Safety Co-ordinator
- The Deputy Safety Co-ordinator
- The Nominated Union Safety representative

IN ADDITION:

Personnel from with The School with specialised knowledge or expertise may be seconded at the discretion of the Safety Co-ordinator.

Personnel from outside The School, for instance, Safety Unit representatives may also be invited.

REPORTING

The Safety Co-ordinator's Report will be submitted to Head of School and the Safety Unit who monitor School Safety.

Any Remedial or Corrective Action found necessary is the responsibility of the person or persons in overall charge of the areas concerned.

A formal response to the Safety Co-ordinator, stating action carried out, and/or a plan of such action is required within three weeks of the Report date.

Safety hazards requiring URGENT ATTENTION will be actioned IMMEDIATELY, without waiting for a written Report.

SUPERVISION

For a Supervisory Structure to function, the co-operation of each and every individual is vital. The responsibility of the individual under this and University Policy is clear and states: **INDIVIDUALS have at all times a duty to conduct themselves, and to do their work in a safe manner so as not to endanger themselves or others. Individuals are required to comply with the School's Policy relating to their activities and relating to action in the case of emergencies.**

Under the Policy, supervision is through the School Health & Safety Management Structure. Supervisors include, Academic, Technical and Administrative Staff. Supervisors are directly responsible for the people under them.

In addition, the following applies to Undergraduate Students:

TEACHING LABORATORY CLASSES

Teaching Laboratory Classes will be supervised at all times. Supervisors may be: Academic Staff, Research Associates, Research Fellows or Research Students employed as *Post Graduate Teaching Assistants*. Training as considered appropriate will be given to Supervisors.

Experiments in all Teaching Laboratories, with the exception of Electrical Machines and Power will have less than 25 volts between terminals and will be considered low risk.

The wiring of Electrical Machines and Power Experiments **must** be checked by a Supervisor before switching on.

Laboratory Technicians are responsible for ensuring the safe working of equipment and plant.

UNDERGRADUATE PROJECTS

Risk assessments must be carried out before the commencement of any work, however students working in designated areas and carrying out intrinsically safe operations may sign a safe working declaration instead which may be found on the Technical support website under "making a Risk Assessments"

Supervisors will be expected to regularly monitor their students' progress and visually inspect the projects. In addition, projects with Identified Hazards will be regularly inspected by the Safety Co-ordinator or Deputy.

Mechanical construction for all project work is to be carried out in the School Mechanical Workshop under the direct supervision and instruction of Technical Staff suitably qualified and trained. *See workshop tools and machinery.*

VISITORS

Visitors are, in general, the responsibility of the individual/s extending the invitations. Access to laboratories, workshops, and similar areas is restricted and only allowed under supervision.

Visitors must report to Reception and sign the visitors' book

TRAINING

Awareness in Health and Safety Matters is a vital factor in creating a safe working environment. Health and Safety training courses of all kinds are available to School personnel, whether in-house, provided by the University, or outside agencies. Lack of training should not be an excuse for poor work practice and inadequate health and safety control measures.

Where training is agreed necessary or advisable then appropriate courses will be arranged by the Safety Co-ordinator. Attendance is obligatory.

The Safety Co-ordinator is responsible for health and safety training and for maintaining records.

As far as possible the Safety Co-ordinator will anticipate training needs and make arrangements with individuals accordingly. In the event of individuals feeling they have not received appropriate training, they should discuss the matter with the Safety Co-ordinator.

RISK ASSESSMENTS

Risk Assessment is the corner stone of good Health and Safety Management.

Risk Assessments, in accordance with the *Management of Health and Safety at Work Regulations 1992* will be carried out on **all** School Activities. The purpose is to identify hazards, evaluate risks and implement control measures where necessary.

Hazard means the potential to cause harm.

Risk means the likelihood of the harm being realised.

All new experiments and projects **must** be the subject of a risk assessment

It is the responsibility of the person carrying out the experiment to carry out the risk assessment.

It is the responsibility of all supervisors (Staff and student) to ensure that risk assessments have been carried out.

Note.

The Safety Co-ordinator and Deputy have received training in all assessments relevant to this School as required by the *Management of Health and Safety at Work Regulations 1992*.

Assessments will be reviewed annually and more frequently where considered necessary.

SAFE USE OF EQUIPMENT/APPARATUS

Commercially produced and purchased equipment and apparatus should be used in accordance with manufacturers instructions and only for the purposes for which it was designed.

The removal of protective covers of such equipment and apparatus may only be carried out by competent persons. Only **Technical Staff** suitably qualified and trained are considered competent.

Where training is required, equipment/apparatus should not be used without it. Appropriate training is either routinely available or can be arranged.

Guards and Personal Protective Equipment is provided and **must** be used where required.

Where a second person is needed for safety reasons, e.g. High voltage working, footing ladders etc., that person **must** be present.

When electrically connecting items of equipment/apparatus together, or taking electrical measurements, appropriate leads and probes should be used, i.e. shrouded for high voltages; sufficient current, voltage and insulation capability.

Take care when using mains powered equipment not to leave leads trailing across the floor.

MAINTENANCE OF EQUIPMENT/APPARATUS

All equipment and apparatus must be maintained in a fit state for use.

In-house repair or modification of commercially produced and purchased equipment and apparatus (this includes changing fuses) may only be carried out by competent persons, i.e. Technical Staff suitably qualified and trained.

EARTHING

Mains powered equipment will be earthed unless double insulated (BS2754 Class 11A or 11B). Earth connections will **not** be removed.

Laboratories are fitted with Residual Current Devices (Earth leakage protection). It should be noted that R.C.D.'s will neither prevent nor limit the magnitude of electric shock, but they do limit the duration. R.C.D.'s will not protect against Line to Neutral shocks.

IN-HOUSE BUILT EQUIPMENT/APPARATUS

Equipment/Apparatus produced in-house must be fit for its intended use and be built to a safe standard, conforming to relevant health and safety regulations and British Standards

Advice from the Safety Co-ordinator or Deputy should be sought.

ELECTRICAL SAFETY INSPECTION AND TESTING

All electrical equipment , apparatus and appliances are safety checked and tested in compliance with University Electrical Safety policy UHSP/18/ES/02 a copy of which may be found in appendix

4.

The tests are as follows.

- 1) User checking.
- 2) Formal inspection.
- 3) Testing

USER CHECKS

Users are responsible for visually checking their equipment every time they use it. Points to look for are: signs of damage, signs of overheating, loose wires and valid inspection labels.

FORMAL INSPECTIONS

In addition to user checks the following is checked.

Casing and mains connecting lead for wear and damage

Correct fuse fitted.

Cable terminations correct and secure

Internal damage and overheating.

TESTING

In addition to formal inspection the following is tested:

Earth bonding

Insulation resistance

Load and operation

The Schedule for formal inspections and tests may be found in appendix 4.

Formal inspection and testing must be carried out by a competent person i.e. Technical Staff suitably qualified and trained.

Equipment is labelled with the test expiry date and name of tester. A register is kept. Every item of equipment has a unique inventory identification number.

Equipment failing a safety test will be withdrawn from service until the fault is corrected.

Equipment undergoing repair is routinely tested.

Testing also applies to other equipment/apparatus as follows: *privately owned brought into the building, items build in-house, items hired or loaned or demonstration, and detachable leads. (Testing of hired, loaned or demonstrated equipment may be carried out by the supplier.)

* Privately owned equipment includes such items as battery powered multimeters, test equipment and multimeters but excludes laptop computers.

DISPLAY SCREEN EQUIPMENT USERS

Assessments will be carried out, of every Workstation used by personnel habitually operating Visual Display Screen Equipment. The purpose of which is to identify and, hence, minimise the long term potential for harm due to incorrect posture and inappropriate lighting.

For the purposes of this Policy, habitual users of DSE are defined as those persons for whom such use forms a significant part of their normal work. Undergraduate Students do not fall into this category. However, assessment will be applied to all workstations from a general health and safety point of view.

Assessments will comply with the *Display Screen Equipment Regulations 1992*, and will take into account the furniture and working environment (lighting etc.) as well as the equipment itself. The Safety Co-ordinator, is responsible for the assessments.

Note.

In the view of the Health and Safety Executive (HSE) the main risks: musculoskeletal problems, visual fatigue and mental stress, can largely be overcome the application of established ergonomic principles.

DSE Users are recommended to plan their working day so that they do not spend excessively long periods on on-screen activity.

Eye tests are available at the School's expense for staff experiencing visual difficulties.

WARNING SIGNS AND AUTHORISED ACCESS

Warning signs are to be displayed outside rooms with identified Hazards and access is restricted to authorised personnel only.

Warning signs should conform to British Standards (*see the Safety Signs Regulations 1980*) Generally signs purchased from bona fide suppliers conform to these standards. Home made signs are unacceptable.

LASERS

Note. This section excludes Class 1 lasers which are considered *inherently safe*. Such lasers are used in laser printers and laser pointers.

Laser safety control measures include:

1. **All** Lasers must be classified and labelled accordingly. A register is kept.
2. The lowest power suitable for the purpose should be used.
3. Wherever possible and practical the beam should be enclosed in such a way that light cannot escape either directly or indirectly (by reflection).
4. Unauthorised personnel should not be able switch on laser equipment. Use key switches if necessary.
5. Instruction in the safe use of Lasers is mandatory.
6. Laser Warning Signs must be used.

Persons using lasers should familiarise themselves with the guidance notes, *Safety in Universities: Notes of Guidance Part 2:1 Lasers*.

Laser eye protection is a last resort. All other practical steps to enclose the beam should be taken first. Eye protection should provide adequate attenuation at the appropriate wavelength (*Protection of Eyes Regulations 1974*).

It is not good practice to look directly into the beam of even class 1 *inherently safe* lasers.

Eye tests are available on request to the Safety Co-ordinator for users of Class 3A, 3B and 4 lasers.

The Safety Co-ordinator is to be consulted over new laser installations.

MICROWAVES

Microwave is defined as electromagnetic radiation, frequency 30 - 300,000 MHz (wavelength 10m - 1mm).

The principle hazard is one of overheating (i.e. microwave cooking?) Eyes are particularly vulnerable; **do not** therefore look directly into the aperture of any microwave radiator.

The Maximum Continuous Occupational Exposure is 10 milliwatts per cm². Intensity measurements may be made on request to the Safety Co-ordinator.

The same safety control measures apply to Microwaves as outlined in the section on Lasers (see above).

The University document, *Safety in the Use of Microwave and Radio frequency Radiations (USP/91/mrr/19)* is a useful reference.

WORKSHOP TOOLS AND MACHINERY

The facilities in the School Workshop are as diverse as milling to metal forming and woodworking to welding. Although the workshop contains much equipment and machinery with the potential to cause harm, it is a safe place to work providing good codes of practice are followed. Staff and Students are therefore permitted access subject to the following conditions, which **must** be strictly adhered to.

1. Supervision, instruction and guidance is by trained Workshop Technical Staff.
2. Instructions **must** be obeyed.
3. Competence of individuals will be assessed by Workshop Staff and the degree of supervision determined. Undergraduate students will receive **direct** supervision (refer to *Supervision* section, page 4).
4. Training will be given where necessary; individuals will not be permitted to work until the training has been given.
5. Users tidy *away* and clean down machines after use. (Tidiness is an important factor in workshop safety).

Workshop Technical Staff are suitably qualified and trained, and are competent to ensure compliance with the above procedures.

Certain machinery and processes require specialised training generally considered beyond the scope of the *Casual Workshop User*. Use is therefore at the discretion of the workshop staff in consultation with the Safety Co-ordinator.

COSHH Assessments must be carried out for, solders and fluxes, oils, cutting fluids, solvents, compressed gases, materials that give dust when being cut or machined etc. Etc.

Numbers of Casual Users in the Workshop at any one time may be restricted according to the availability of workshop staff to provide adequate supervision.

All Workshop users will comply with codes of good workshop practice (*See Provision and Use of Work Equipment Regulations 1992; Workplace Health, Safety and Welfare Regulations etc.*). For the Casual User this generally means fully co-operating with the Workshop Staff.

Guards and Personal Protective Equipment will be used.

Only Workshop Staff are qualified and trained to change abrasive wheels.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal protective equipment should only be necessary where hazards cannot adequately be controlled by other means, e.g. guards and fume extraction etc.

PPE is as diverse as clothing, safety footwear and spectacles for VDU users, and will be supplied where it is agreed necessary. Current standard allowances will be paid by the School, any charges above the allowance will be met by the user.

Note. Wearing PPE may give a false sense of security as it is seldom fully effective, so caution should always be exercised.

MANUAL HANDLING

Back problems are the single largest cause of time lost from work in this country. Lifting and movement of objects in the workplace accounts for much of this loss. Assessments of Manual Handling Operations are aimed at reducing the risk of injury to the lowest reasonable practical level.

Assessments of all Manual Handling Operations within the School will be carried out in compliance with the *Manual Handling Operations Assessments Regulations 1992*, and University policy.

Importantly, as well taking into account such factors as, weight, bulk, shape, quantity of the object/s, and, reaching, stooping, twisting of the operatives, the assessments take account of the individual operatives' stature and physical capability. The Regulations do not therefore preclude any able bodied person from lifting and moving objects as part of their work, they help specify an individualised method of handling.

Appropriate training/instruction on safe handling will be given where necessary.

In the first instance Supervisors may carry out the assessments, referring to *University Assessment of Manual Handling Operations Guidelines* (copies available from the Safety Co-ordinator). The Safety Co-ordinator's advice should be sought if it appears that the manual handling operation cannot be safely carried out.

Where an assessment indicates the need for mechanical lifting aids of any kind (block and tackle, hydraulic lifts etc.) then assistance **must** be sought.

The lifting and movement of heavy objects may only be carried out under the direct supervision of Staff with relevant training (*see appendix 5*). Lifting and slinging equipment is regularly maintained and kept under the control of such trained personnel.

In the first instance Supervisors may carry out the assessments, referring to *University Assessment of Manual Handling Operations Guidelines* (copies available from the Safety Co-ordinator). The Safety Co-ordinator's advice should be sought if it appears that the manual handling operation cannot be safely carried out.

Where an assessment indicates the need for mechanical lifting aids then assistance **must** be sought (*See Lifting and Slinging*).

LIFTING AND SLINGING

The lifting and movement of heavy objects, requiring the use of mechanical handling aids of any description, must only be carried out under the direct supervision of Technical Staff with relevant training (*See appendix 5*).

Lifting and slinging equipment is regularly maintained and kept under the control of such trained personnel.

LADDERS

All ladders are inspected at six monthly intervals and a register is kept. Ladders have a unique identification number and are labelled with the inspection expiry date.

Ladders will be issued to competent persons only. Competence will be assessed and instructions for safe use given only by persons who have attended an appropriate ladder safety course.

See appendix 3.

CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH (COSHH) REGULATIONS 2002)

COSHH is not just about chemicals; it is all embracing and includes any substance with the potential to cause harm. For instance, printer toner and dusts from cutting various materials (even wood dust) constitute health hazards therefore COSHH applies.

The purposes of COSHH Assessments are:

- 1.To identify the inherent hazard/s of a substance.
- 2.To evaluate the risk/s in using the substance in a particular process.
- 3.To determine control measures.
- 4.To inform other users.

The control measures must be implemented.

The combination of (1) and (2) will direct the assessor towards developing appropriate control measures. It is clear that to use a particular substance used in two different processes may have two quite different assessments.

Hazard means the potential to cause harm.

Risk means the likelihood of the harm being realised.

TO IDENTIFY HAZARDS, Data Hazard Sheets are available from the suppliers and/or manufacturers of the substances. Suppliers and Manufacturers must, by law, supply hazard data sheets on request.

Assessment forms are available from the Technical Services web site.

Note: Propriety branded substances (such as adhesives, paints, cleaning and correcting fluids etc.) do not require written COSHH Assessments provided they are used for their intended purpose and in accordance with the manufacturer's instructions as stated on the containers. Reading the labelling information and instructions constitutes an assessment.

General guidance:

- (i) Minimum quantities of chemicals should be kept in the workplace for daily use.
- (ii) Minimum quantities of chemicals should be purchased.
- (iii) Materials should be purchased pre-cut where practical.
- (iv) Incompatible chemicals must be segregated (cocktails can be highly dangerous).
- (v) Containers must be clearly labelled.
- (vi) Flammable substances must be stored in fire resistant enclosures.
- (vii) Emergency action must be clearly displayed.
- (viii) Appropriate antidotes must be readily available.
- (ix) Appropriate fume/dust extraction and PPE must be used.
- (x) Wash hands. No food, drink or application of cosmetics in the workplace.

COSHH also covers compressed and very low boiling point gases (see section on Gases).

Further information (including an assessment form) can be found on the Web site :
<http://www.eee.bham.ac.uk/techsupp>

COSHH ORGANISATION WITHIN THE SCHOOL

Each uniquely identifiable Group within the School is responsible for carrying out its own assessments and maintaining records (Research Groups, Support Services etc each group has a nominated and suitably trained COSHH representative (*appendix 3*)). Further COSHH advice may be sought from the Safety Co-ordinator.

PURCHASING NEW SUBSTANCES

COSHH Assessments should be carried out before purchasing substances not previously used or in a process not carried out before. Outgoing orders are monitored for COSHH related substances and follow-up checks made to ensure that assessments have been completed.

CHEMICAL STORAGE

If minimum quantities are purchased storage is also minimised.

General guidance:

- (i) Store rooms/areas should be secure and warning signs used.
- (ii) Appropriate containers should be used and clearly labelled.
- (iii) Chemicals should be segregated according to hazard (alphabetical storage may seem tidy but it can be dangerous).
- (iv) The bulk quantities of petroleum spirits, highly flammable solvents and compressed gas cylinders should be stored outside the main building.
- (v) Store rooms/areas should be regularly reviewed to avoid unnecessary accumulation.

TRANSPORTATION

Transportation of hazardous chemicals and compressed gases is not a regular School activity. Anyone becoming involved with transportation should refer to the University Document *Rules for the Transport of Hazardous Chemicals in Road Vehicles* and consult with the Safety Co-ordinator.

Transporting very low boiling point gases is dealt with in Section on Gases.

WASTE DISPOSAL

The days of dumping waste into the nearest dustbin or pouring it down the drain are long gone. The University has a Duty of Care under the Environmental Protection Act 1990 to control the disposal of waste. Solvents, oils, chemicals may come into this category; other materials/substances (asbestos for instance) certainly do.

Waste disposal is implicit in COSHH Assessments. Information relating to disposal is contained in the Hazard Data Sheets. Disposal must be taken into account when purchasing.

Discounted prices for bulk quantities is not cheap if disposal of the excess has a cost implication. And long term storage in the hope of a future need arising is bad practice.

Where waste material represents an environmental hazard/pollutant (the COSHH Assessment will determine this), it must only be disposed of via Licensed Waste Disposal Agent.

Queries concerning waste disposal should be addressed to the Safety Co-ordinator, sooner rather than later.

GASES

LIQUEFIED GASES

COSHH Assessments are required for cryogenic liquids (very low boiling point, e.g. -196 degrees C for liquid nitrogen). Care should be taken when using.

Typical hazards are:

- (i) Frostbite. Eyes are particularly at risk. PPE is essential, goggles, leather gloves etc.;
- (ii) Asphyxiation. Vaporising liquids (liquid oxygen excepted) can cause oxygen depletion. Therefore use in well ventilated areas. Do not directly inhale the gases;
 - (iii) Vaporising liquid can cause the atmosphere to become enriched with oxygen causing a fire to burn more fiercely. Ventilate well.

Containers should be clearly marked.

Store in well ventilated areas.

Transportation:

- (i) vehicles must be clearly marked as carrying cryogenic liquids;
- (ii) at least one window must be open;
- (iii) vehicles must not carry passengers;
- (iv) there must be a substantial barrier between the liquid and the occupant/s.

For further information see the University Document *Rules and Advice on the Safe Handling of Very Low Boiling Point Liquefied Gases (USP/88/LG/9)*.

Note: Glass vacuum flasks should not be used as they are liable to shatter. Expanded Polystyrene containers are a safer alternative.

COMPRESSED GASES

No one may use compressed gases without appropriate training. Short (half day) instruction courses are run by the Safety Unit several times each year. The Safety Co-ordinator will arrange on request.

Basic control measures should ensure that:

- (i) COSHH Assessments have been made;
- (ii) cylinders are correctly labelled;
- (iii) the system to which the cylinder is connected is designed to take the pressure;
- (iv) appropriate regulators with flashback/backfeed arresters are used;
- (v) cylinders (full or empty) are secured in a vertical position (this also applies to transportation);
- (vi) cylinders stored outside are in vandal proof enclosures.

BOC Booklet, *Safe Under Pressure* is a useful reference.

Note.

The following section on PRESSURE SYSTEMS is to be read in conjunction with this section as it also applies.

PRESSURE SYSTEMS

Pressure Vessels and associated control gear will be examined by a *competent person at specified intervals:

Steam boiler	annually
Compressed air receivers (compressors)	2 yearly
Compressed air/gas cylinders	4 yearly

* The term *Competent Person* in this case applies only to the University's Insurance Company's Engineer Surveyor.

Pressure vessels must be marked with a unique number, safe working pressure and date when the next inspection is due. A register is kept by the Safety Co-ordinator.

Persons designing or constructing pressure vessels for School activities (e.g. research or other purposes) should familiarise themselves with the *Pressure Systems and Transportable Gas Containers Regulations 1989*. They should not begin work until discussing first with the Safety Co-ordinator.

(There are also various HSE guidelines available from HMSO).

FUME/DUST EXTRACTION

COSHH Assessments will determine the need for fume/dust extraction. Where it is indicated extraction **must** be used.

The School has two fume cupboards for general use situated in the 5th floor process room. They are only safe to use for the purposes specified on the cupboards themselves. If required for other use then advice must be sought from the Safety Co-ordinator

The user must be in possession of a current permit to work in order to use the fume cupboards

The Cupboards are maintained annually.

There is a portable Local Exhaust Ventilation Unit (LEV) held in the Mechanical Workshop. It may be used anywhere in the building as required.

Where tools (drills and saws etc.) have dust extraction attached, it must be used.

Other areas with extraction:

Printed Circuit fabrication area (N336) is fully ventilated.

Laser Ablation Room (NG13) has fail safe LEV for laser gases.

These facilities are for authorised personnel only and must be used for the purposes intended.

Note..

The escape of fumes should always be minimised by good working practices.

ELECTRICITY & LIVE WORKING

Persons working with electricity should first read The Electricity at Work Regulations 1989 which are available from web address:-
http://www.legislation.hmso.gov.uk/si/si1989/Uksi_19890635_en_1.htm

The potential for electricity to cause harm is immense. The main risks are:

Shock – Burn – Explosion

Of these, shock is probably the most likely in this School. The effects of shock are : Pain – Loss of Muscle Control – Internal Bleeding – Nerve, Muscle and Tissue Damage –DEATH

The Electricity at Work act states that:

"No person shall be engaged in any work activity on or so near any live conductor (other than one suitably covered with insulating material so as to prevent danger) that danger may arise unless-

(a) it is unreasonable in all the circumstances for it to be dead; and

(b) it is reasonable in all the circumstances for him to be at work on or near it while it is live; and

(c) suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury".

In practice this means that:

All current carrying conductors (Cables, Circuit board copper tracks, Terminals etc) must be covered or shrouded by insulating material in such a manner that it is impossible for someone to come into contact with them. It may be necessary to build the equipment into a housing/box.

Working on live exposed conductors with voltages (over 50V) should be avoided. However, this Policy accepts that it is not always possible or practical. Where Live Working is necessary and has been approved by the Supervisor, the following precautions must be taken:

- (i) Two persons must be present;
- (ii) Exposure must be kept to an absolute minimum;
- (iii) Test probes and connectors must be adequately shrouded.
- (iv) Wherever practicable a removable cover should be used such that temporary connections with test probes may be made and the cover replaced before power is restored and measurements taken.

Note 1. Working on Live conductors without first exploring ALL possible alternatives is a breach of this Policy.

Note 2. Power circuits and low voltage circuits should be separated and so constructed that work may continue on low power circuits without the risk of electric shock.

SOLDERING IRONS

Soldering irons get hot, approximately 300 C. The tips will severely burn any part of the body or clothing they come into contact with.

Fumes given off by the Rosin contained in many multicore solders are a respiratory irritant and as such are covered by the *COSHH regulations 1994*. Wherever possible always use solder available from the School stores which is Rosin free.

Solder with care.

- (1) Use a proper soldering iron stand.
- (2) Switch off iron when not in use.
- (3) Do not allow soldering iron leads to trail from benches or across the floor.
- (4) Ventilate area/s where soldering takes place.
- (5) Avoid direct inhalation of fumes.

WORKING WITH WATER

Electricity and water is a dangerous mix. Extra care must be taken. Voltages should be kept as low as possible, and equipment earthing double checked - including metal water tanks.

TANK LABORATORY (NB20). is in an isolated part of the building. The tank itself is 10m x 3m x 3m deep. The risk of drowning is very real. In addition to all other health and safety requirements, Two Persons must be present when accessing the water and/or working on the boards covering the tank. Other information regarding working with water, see section on Field Work.

FIELD WORK

Field Work is essentially an extension of School activities, hence this Policy applies.

In recognising that Field Work often involves greater dangers, the University has produced a comprehensive document entitled *University Rules and Guidance for the Safe Conduct of Fieldwork, Expeditions and Outdoor Activities*. Persons, particularly Supervisors, contemplating Field Work should familiarise themselves with it.

Diving is inherently dangerous. The regulations contained in the Health and Safety at Work Act 1974 regarding training, competence and diving site procedures are explicit and must be complied with.

Life jackets and protective clothing for working in open water will be provided by the School and must be worn.

The Safety Co-ordinator should be consulted when new Field Work projects are being planned.

MOVING PARTS

Wherever possible, rotating and other rapidly moving parts should be closely shielded or guarded. Where for experimental measurement purposes this is not possible, then the area surrounding the machinery must be enclosed. Operatives must be outside the enclosure before the machinery is activated.

All Undergraduate Teaching Laboratory Experiments with moving parts are fully shielded.

NEW WORKS

The Safety Co-ordinator and Trade Union Representatives (where appropriate), are to be consulted at the planning stage of new works, whether building projects, refurbishments or new facilities (research, undergraduate or other). New works must comply with all relevant health and safety legislation, and subsequent costing budgeted for.

CONTRACTORS

Contractors (including contract cleaning) are bound by this Policy and have a general duty not to put others at risk from their activity. Perceived dangerous practices by contractors should be reported to the Safety Co-ordinator.

Under no circumstances should contractors be allowed the use of School tools or equipment.

NOISE

Noise is not considered a major health hazard within the School. High noise levels are infrequent and likely to be intermittent (noisy machinery and work operations etc.). When they occur, hearing protection will be supplied to any person working in the area as necessary. Noise level surveys may be requested from the Safety Office if a noise problem is perceived.

TIDINESS

It is not unreasonable to suggest that tidy working areas are likely to be safer than untidy work areas. Tidy working is good *Engineering Practice*. This applies equally to storage areas.

Corridors must not be narrowed by using them for storage and under no circumstances should fire escapes be blocked.

SMOKING

The Gisbert Kapp Building is a non-smoking area. This includes School vehicles.

FOOD AND DRINK

The consumption of food and drink is prohibited in all areas other than those designated, i.e. cafe area at reception and N418 and N112

Exceptions can be made for other School bookable rooms, with the agreement of Ben Clarke, UG Office, N126

And the understanding that it is organised to remove all items after use. Catering must be provided by University approved caterers only. This will form part of any approval given

BIBLIOGRAPHY

1. *Health and Safety at Work Act 1974.*
2. *Management of Health and Safety at Work Regulations 1992.*
3. *Management of Health and Safety within Budget Centres 1994.*
4. *Electricity at Work Regulations 1989.*
5. *Safe Use of Portable Electrical Apparatus, Guidance Note PM 32.*
6. *Provision and use of Work Equipment Regulations 1992.*
7. *Workplace Health, Safety and Welfare Regulations 1992.*
8. *Control of Substances Hazardous to Health Regulations 1988.*
9. *Good Chemical Practice (University Safety Document).*
10. *Making a Hazard and Risk Assessment (University Safety Document).*
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12. *Environmental Protection Act 1990.*
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15. *Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985.*
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18. *University Rules and Guidance for the Safest Conduct of Fieldwork, Expeditions and Outdoor Activities.*
19. *Personal Protective Equipment at Work Regulation 1992.*
20. *Protection of Eyes Regulations 1974.*
21. *BOC Booklet, Safe Under Pressure.*
22. *Pressure Systems and Transportable Gas Containers Regulations 1989.*
23. *Rules and Advice on the Safe Handling of Very Low Boiling Point Liquefied Gases (University Safety Document).*
24. *Manual Handling Operations Regulations 1992.*
25. *University Assessment of Manual Handling Operations Guidelines.*
26. *Display Screen Equipment (Health and Safety) Regulations 1992.*
27. *Noise at Work Regulations 1989.*
28. *Abrasive Wheels Regulations.*
29. *The Safety Signs Regulations 1980.*
30. *Food Safety Act 1990.*

APPENDIX 1

Electronics, Electrical & Computer Engineering

INSTRUCTIONS IN CASE OF FIRE

ON DISCOVERING A FIRE:

- 1) Operate the nearest fire alarm (use heel of shoe or covered elbow)
- 2) dial 44444 on the internal phone : state details to control room
- 3) if the person discovering a minor outbreak of fire is certain they can extinguish it with the appliances available, at no risk to themselves they should do so
- 4) Leave the building by the safest and shortest route.

THE FIRE ASSEMBLY POINTS

Assembly Point 1

Is on the grassed area adjacent to the main Gisbert Kapp building and the Netshape building.

Assembly Point 2

Is on the grassed area adjacent to Horton Grange, follow the path at the rear of the building adjacent to the Tennis courts

When the fire alarm sounds (the bells will ring for longer than 10 seconds) all occupants will:

- 1) Leave the building by the shortest route.
- 2) Make their way to the fire assembly points keeping well away from the building.

Fire Wardens will direct you to the nearest assembly point

DO NOT USE THE LIFTS

Disabled personnel unable to make their own escape should position themselves in a refuge behind a fire door, by the lifts and await assistance from a fire officer.

Fire wardens will inform the Safety Co-ordinator or his deputy as to the whereabouts of such personnel.

REMEMBER

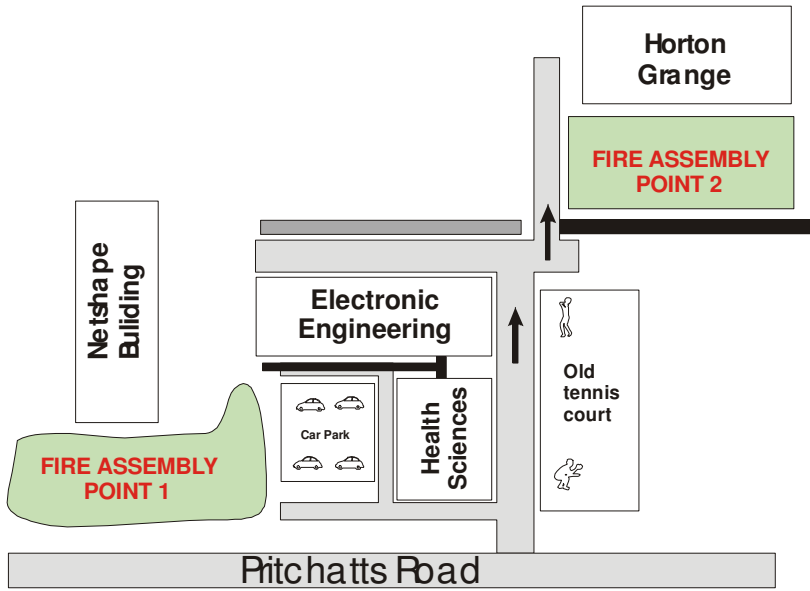
When the fire bells ring your primary task is to evacuate the building

DO NOT TAKE UNNECESSARY RISKS WITH YOUR OWN SAFETY

NO ONE will re-enter the building unless told to do so by a fire officer or Safety Co-ordinator.

FIRE ASSEMBLY POINTS :

- 1) Grassed and pathed areas in front of the NetShape Building
- 2) Grassed Area in front of Horton Grange



APPENDIX 2

FIRE WARDENS

FIRE WARDEN DUTIES

In the event of a fire or other emergency [Fire bells ringing for more than 10 seconds], you should take the following actions **in so far as they do not endanger your own safety:**

- 1) Instruct occupants of **ALL** rooms on your floor (including toilets) to leave the building IMMEDIATELY by the shortest possible route, **NOT** via the lifts. Close doors of all vacated rooms.

Instruct persons in wheelchairs, or who would find it difficult to use the stairs, to go to the nearest emergency exit and wait **BEHIND** the fire door, within the escape way, for assistance by the fire brigade.

- 2) Report to the Safety Co-ordinator or deputy at the assembly point. Indicate the whereabouts of persons you believe may still be in the building, and any rooms you were unable to check.
- 3) Prevent persons from re-entering the building until the all clear is given, The “All Clear” may only be given by a Fire Officer or Safety Co-ordinator.
- 4) **Direct persons away from the immediate vicinity of the building and to the assembly point.**

DO NOT: wait until your floor is clear before leaving.

DO NOT: delay your own evacuation by attempting to persuade persons who are reluctant to leave.

If you are not on your designated floor when the fire bells sound but are :

- a) On the floor above and feel that you can **safely** check your floor on your way out then do so
- b) On a floor below - Under no circumstances return to your floor; evacuate immediately and report to the Safety Co-ordinator.

APPENDIX 3

STAFF WITH SAFETY SUPERVISORY RESPONSIBILITY

Head of School: Professor Chris Baber

College Health and Safety Officer: Mr. Terry Green

School Safety Co-ordinator: Mr. Andrew Dunn

School Deputy Safety Co-ordinator: Mr. David Checkley

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APPENDIX 4

Electrical Safety - University Health & Safety policy Document UHSP/18/ES/02

INTRODUCTION

The *Electricity at Work Regulations 1989* require precautions to be taken to prevent the risk of death or personal injury from electricity arising from work activities. These activities include the construction and manufacture, installation, use, maintenance and repair of electrical installations, systems and equipment.

This Policy is based on guidance issued by the Health and Safety Executive and the Institution of Electrical Engineers.

The responsibility for implementing this Policy rests with Heads of Budget Centres.

Scope of this document

This document sets out the University Policy for Electrical Safety. It also contains Guidance to assist in the implementation of that policy. It covers all use of electricity for which the University is responsible whether on or off campus. It applies to all equipment and installations whether new, second hand, borrowed, leased or donated.

The aim of the policy is to prevent electric shock or fire occurring due to a malfunction of the equipment or installation. It also briefly covers the risks that can arise when electricity is used with or near substances, such as ignition or explosion. In these instances more information can be found in the University's Hazardous Substances Policy.

Responsibility for specific parts of an installation

The University's electrical infrastructure

The Director of Estate Management is responsible for the University's electrical infrastructure; i.e. the electrical installation from the incoming supply up to and including the wired sockets or switch fuses.

For equipment, which plugs into the mains supply

Heads of Budget Centres are responsible for equipment and/or installations and wiring up to and including the plugs.

For equipment that is wired in to the mains supply

Heads of Budget Centres are responsible for the equipment and/or installation and wiring up to the switch/fuse.

Definition of 'Competent' as it applies to the Policy

Levels of competency required will vary depending on the work and hence the risks involved. To be classed as competent a person needs sufficient technical knowledge and practical experience to carry out the work safely, i.e.:

- An adequate knowledge and experience of working with electricity.
- An adequate understanding of the system/equipment to be worked on and practical experience on that type of equipment.
- An understanding of the hazards that may arise during the work and the precautions needed to be taken to deal with them.

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- A knowledge of the current electrical standards which apply to the work being undertaken.
- A knowledge of University, Budget Centre and Estate Management policies and procedures which apply to the work being undertaken.
- The ability to recognise at all times whether it is safe for work to continue.

POLICY

The Director of Estate Management

is responsible for making arrangements to ensure that:

- The University's electrical infrastructure is installed, maintained and operated in a safe condition to the current approved standard.

Heads of Budget Centres

are responsible for making arrangements to ensure that, within their area of responsibility:

- All new and refurbished electrical equipment is to current approved British Standards. This includes equipment made in house. Standards of electrical safety must not be relaxed because something is considered 'temporary or experimental'.
- All electrical equipment that is in use is maintained in a safe condition. This will include checking, inspecting and testing as appropriate in accordance with Schedule 1.
- All work involving electricity is organised and managed to eliminate or reduce to a minimum the risk to those carrying it out and others that may be put at risk.
- Work on live equipment or near any live conductor (other than those suitably insulated) is prohibited except when the criteria in Schedule 2 apply.
- Those designing, installing, maintaining, repairing, inspecting or testing electrical equipment are competent (as defined in the Introduction) and are authorised by their Budget Centre.
- Records of inspections, testing and maintenance are kept.
- Equipment wired into the mains supply is only connected or disconnected by Estate Management or their authorised contractors.
- Arrangements are made to prevent unsafe equipment being used.
- Personal electrical equipment, if allowed, is treated as if it were University equipment. This does not apply to personal equipment belonging to residential staff and students in a hall of residence, which is being used for private use in their own rooms.
- Residential staff and students are given guidance about the safe use of electrical equipment and checks are made to ensure this guidance is followed. (See page 9).

Individuals

must:

- Ensure, to the best of their ability, that any electrical equipment they use is undamaged and safe.
- Use electrical equipment correctly and not overload the power supply.
- Notify their manager or supervisor if they bring into service any electrical equipment, including personal equipment. (Note this does not apply to personal equipment belonging to students in a hall of residence, which is being used for private use in their own rooms.)
- Report any defective electrical equipment to their manager or supervisor.
- Not attempt to repair, dismantle or otherwise interfere with electrical equipment unless competent (as defined in the Introduction) and authorised.

SCHEDULE 1

CHECKING, INSPECTING AND TESTING OF ELECTRICAL EQUIPMENT

All electrical equipment that is **in use** must be maintained in a safe condition to prevent danger. (The main dangers are electric shock and fire.)

In use means equipment that is currently being used or is capable of being used.

The table identifies three (maintenance) levels of checks, inspection and testing for equipment in use

- Appropriate User Checks.
- Formal Inspections.
- Testing.

Additionally all electrical equipment should undergo a formal visual inspection before being put into use at the University for the first time. This includes new, second hand, borrowed, leased, donated or repaired equipment.

Frequency & Types of Tests

Type of equipment	Examples	Requirement
<p>Fixed equipment Equipment that forms part of a system and is fixed in position.</p>	<p>Air-conditioning units Fume cupboards Safety cabinets Heaters (fixed, non portable) Radiators Pumps Walk in freezers</p>	<p>Formal inspection and test in accordance with the recommendations laid down by the supplier.</p>
<p>Installed equipment 'Industrial' equipment. May be fixed in position. May be built in. May be 240 volts or 415volts. May be hard wired or be plugged into the mains supply.</p>	<p>'Industrial' washing machines 'Industrial' dryers 'Industrial' cookers 'Industrial' dish washers Large workshop machines Large photocopiers Large autoclaves Large centrifuges Large furnaces Ventilated cupboards Large microscopes</p>	<p>Appropriate User Checks. Formal visual inspection every 2 years. Test in accordance with the recommendations laid down by the supplier. If no recommendation test every 4 years if used in wet or adverse conditions.</p>
<p>Stationary equipment Equipment not designed to be moved from place to place. Usually 240 volts. May be hard wired or be plugged into the mains supply.</p>	<p>'Domestic' washing machines 'Domestic' tumble dryers 'Domestic' dish washers 'Domestic' cookers Refrigerators Freezers Microwave ovens Bench top workshop machines Safety cabinets Drying cabinets Bench top furnaces Bench top ovens Incubators High capacity pumps Treadmills, rowing machines, etc.</p>	<p>Appropriate User Checks. Formal visual inspection every 2 years Test every 4 years if used in wet or adverse conditions.</p>

<p>Movable equipment (1) Equipment that is easily moved and:</p> <ul style="list-style-type: none"> • Draws a high current; or • Is used in wet or adverse conditions; or • Is used in an adverse way; or • Is hand held. <p>Usually 240 volts plugged into the main supply but may be a lower voltage e.g.110 volts.</p>	<p>Kettles and coffee makers Toasters Portable heaters Portable humidifiers Floor cleaners Bench top autoclaves Bench top centrifuges Bench top heaters Mixers Hot plates Hand held dryers Photometers Low capacity pumps Shakers Stirrers Water baths Engravers Inspection lamps Welding sets Soldering irons Hand held angle grinders Hand held drills Hand held sanders/planers Hand held saws Portable blowers Pressure washers Lawn mowers Extension leads and power cords Used with the above</p>	<p>Appropriate User Checks. Formal visual inspection every 6 months. Test every year.</p>
<p>Movable equipment (2) Equipment moved frequently and:</p> <ul style="list-style-type: none"> • Draws a low current; and • Is not used in wet or adverse conditions; and • Is not used in an adverse way; and • Is not hand held. <p>Usually 240 volts plugged into the main supply but may be a lower voltage e.g.110 volts.</p>	<p>Balances Measuring devices/meters Small Microscopes Desk/bench top lamps Fans Portable televisions/video &DVD players Portable projectors Portable sound systems Extension leads and power cords used with the above</p>	<p>Appropriate User Checks. Formal visual inspection every year. Test every 2 years.</p>
<p>Movable equipment (3) Equipment moved infrequently and:</p> <ul style="list-style-type: none"> • Draws a low current; and • Is not used in wet or adverse conditions; and • Is not used in an adverse way; and • Is not hand held. <p>Usually 240 volts plugged into the main supply but may be a lower voltage e.g.110 volts.</p>	<p>Most AV equipment Shredders Projectors Televisions/video & DVD players Hi-Fi equipment Computers and peripherals Servers Telephonic equipment Fax machines Photocopiers Microscopes Spectrophotometers Extension leads and power cords used with the above</p>	<p>Appropriate User Checks.</p>

Lap top computer mains adapters		Appropriate User Checks.
Equipment less than 50 volts	Telephonic equipment	None
Battery operated less than 20 volts		None

Notes:

1. The requirements for the examples given are not definitive. A more rigorous regime may be required or a less rigorous one may be allowed based on a risk assessment.
2. It may be necessary to increase the frequency of inspections and testing if circumstances dictate, (e.g. particularly adverse conditions, adverse use, experience or recurring defects).

Examples of Adverse Conditions Wet, damp, condensation, near sources of heat, where cables can be run over etc.

Examples of Adverse Use Cables being dragged, towed twisted etc, equipment being roughly used etc.

Appropriate User Checks

A visual inspection is very important. It encourages the person using the equipment to look critically at the equipment they are using. No formal record of these checks is required to be kept.

Not all equipment will need the same checks; the risk of damage that equipment and cables could be subjected to should be assessed.

For Example:

Equipment which is moved regularly:

- Each time before use check appliance and cable and plug (especially if cables are dragged about).

Equipment that is moved infrequently but is regularly unplugged:

- Each time before plugging in check plug and the part of the cable leading into the plug.
- Occasionally check appliance and visible length of cable.

Equipment that is moved infrequently and is not regularly unplugged:

- Occasionally check appliance and visible length of cable.
- When unplugged check the plug and the part of the cable leading into the plug.

Equipment that is hard-wired into the mains supply:

- Occasionally check appliance and visible length of cable.

Points to look for:

- The condition of the equipment, signs of damage, misuse and obvious defects.
 - Signs of overheating.
 - Loose wires.
- 6
- The condition of the cable and armoring. Particular attention should be paid to any cuts, scuffing, crushing, signs of overheating, burns, chemical contamination, fraying, any visible inner wiring, signs of abrasion and stretching.
 - The condition of plugs and sockets including damage, looseness and contamination.
 - The effectiveness of the strain relief for the cable, (usually fitted on equipment rated at 415 volts).

Formal Visual Inspections

This is an important component of a maintenance system since these inspections will enable most potential faults to be discovered. These inspections are more formal than user checks and are carried out at prescribed intervals.

The formal inspection should be carried out in a systematic way, preferably following a check list.

The *User Check* should be carried out first. Additionally the following should be checked:

- The whole length of the lead that it is free from defect.
- That the correct fuse is fitted.
- That the cord grip is effective.

And if the plug top can be removed:

- That the cable terminations are correct and secured.
- That there is no sign of internal damage, overheating or ingress of liquid or foreign matter.

The results of the formal inspection must be recorded.

Testing

Testing should reveal faults that cannot be detected by user checks and inspections.

The essential tests are:

- earth bond (class 1 equipment only);
- insulation resistance.

The results of testing must be recorded.

For equipment rated up to 240 volts and plugged into the mains supply a portable appliance tester (PAT) is needed to carry out these tests.

For equipment hard-wired into the mains supply and/or rated above 240 volts more specialised equipment is required.

SCHEDULE 2 WORK ON OR NEAR LIVE EQUIPMENT

Unless there is no risk, work on live equipment or near any live conductor (other than those suitably insulated) is **prohibited** unless **all** the following criteria are met:

- It is unreasonable in all circumstances for the equipment or conductor to be dead.

AND

- It is reasonable in all circumstances for the person to be at work on or near the equipment or conductor while it is live.

AND

- Suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

Notes:

Circumstances where it may be necessary to work on live equipment or near live conductors include:

- Commissioning or adjusting equipment.
- Fault finding.

This may include large high voltage fixed items of the infrastructure or plant or small low voltage equipment such as television sets.

If live working is carried out a **safe system of work** is required based on a risk assessment. This should include:

- Only allowing the minimum number of people to work on the equipment.
- Having the equipment live for the minimum length of time.
- Using the correct tools.
- Ensuring that those working are competent.
- Preventing others not involved from getting near the live conductors.
- Indicating the live areas.
- Using earth free areas.
- Using residual current devices (RCDs).
- Ensuring adequate space around the live areas.
- Ensuring that the floors are not slippery and that there is adequate lighting.
- Having arrangements in place in case someone does come in contact with a live conductor and sustains an electric shock.
- Having permit to work procedures.

Further guidance can be obtained from the Health and Safety Executive's publication *Electricity at Work-Safe Working Practices*, HSG 85.

GUIDANCE

Design of equipment

In general the University guidance, *Guidance on Equipment Provided for Use at Work: GUIDANCE/1/EPUW/99* should be followed. Specifically for electrical equipment the following precautions should be taken, depending on the equipment involved:

- All cables, plugs, sockets and connectors should be of a good quality and standard.
- Flexible cables should also be adequately sized and protected with proper connections and colour codes.
- Mains input switches should be suitably placed and 'ON' and 'OFF' positions clearly indicated.
- All phases should be disconnected by the operation of the mains switch.
- An effective over current protection device, (e.g. a fuse) should be provided in each phase of the circuit and be arranged to disconnect the electricity supply in the event of overload or short circuit.
- If the supply is through an isolator, provision should be made for securing the isolator switch against inadvertent or unauthorised operation, (e.g. padlock).
- All live terminals should be screened. If it is necessary for an operator to have access to particular parts of the interior of a machine, this should not allow access to live electrical parts at the same time, (e.g. by the use of interlocks, guards etc).
- If heating elements are used they should be placed or installed so as to cause no deterioration of electrical equipment that would put persons at risk.
- If fluids, except transformer oils and the like, are used in equipment, they shall be used and housed so that they do not come into contact with electrical conductors and components. Where the incorporation of conducting or other fluids into equipment is necessary, the design should, as far as possible, place the fluids at the lowest level possible. If flammable fluids are used special attention should be given to prevent sparking and the build up of flammable gases in the equipment enclosure. If this is not possible, flameproof or intrinsically safe components should be used.

Electrical equipment supplied for use outside the University

If the equipment is supplied by the University for use by another organisation or individual outside the University then where necessary it has to comply with the relevant EC product directive standards and be 'CE' marked. This is a complicated issue and advice should be sought from the Health and Safety Unit.

(Note: 'Supply' includes sold, donated, lent, leased and hired.)

Use of electrical equipment out of doors, in laboratories, workshops, craft areas etc.

There are special risks associated with the use of electrical equipment in these areas where conditions may not be ideal. Residual Current Detectors (RCDs) should be used to minimise the risk of electric shock. Risk assessments of the hazards involved should be made. Hazards include:

Using electrical equipment out of doors

- The equipment should be designed to be used out of doors.

Using electrical equipment in the vicinity of water or other conducting fluids

- Segregate and protect electric equipment from these fluids. Ideally the distance from a water tap to a source of electricity or any electrical equipment should be greater than 2.5 metres, (to

prevent a person touching the tap and electrical equipment at the same time.)

Using electricity for heating or near heat sources

- High temperature insulated cables or thermal shielding should be used to prevent deterioration of the supply cables.

Using electrical equipment where flammable vapours may be present

Refer to the University's Hazardous Substances Policy UHSP/15/HS/00.

- Care should be taken to prevent electrical sparking that could lead to ignition.
- It may be necessary to use flameproof or intrinsically safe equipment.

Wear and tear on equipment and cables

- Equipment should be treated with care.
- Cables should be protected from cuts and abrasion.
- Equipment should be plugged directly into its own socket with as short a cable as practicable.

Hand held lamps or lamps used with machinery

These are particularly vulnerable to damage and rapid wear.

- They should be adequately protected.
- They should be fed from a low voltage supply, (i.e. 110 volts maximum).

Batteries

Batteries may present special risks including:

- Difficulty in controlling the electrical output from the battery
- The potential for a short circuit across exposed terminals.

Precautions should include:

- The fitting of protection devices as near to the battery as possible, (e.g. fuses, current limiting resistors, circuit breakers etc.)

- Covering terminals so a that short circuit will not occur if objects fall across the terminals.

- Not wearing watches or jewellery when working on or near batteries in case they come in contact with exposed terminals.

- Wearing suitable personal protective equipment in case of acid spill.

Additional precautions for using rechargeable wet batteries should be taken due to the potentially explosive levels of hydrogen produced during charging:

- The area should be well ventilated.

- Electrical fittings in the vicinity should be intrinsically safe.

- Before connecting or disconnecting the batteries the circuit should be broken away from the immediate vicinity.

Repairs

When carrying out repairs to electrical equipment there are risks:

- To persons carrying out the work.

- To persons in the vicinity.

- Of the repairs not been completed correctly leading to the possibility of electric shock, overheating or fire.

Precautions should include:

- Repairs only being carried out by competent persons.

- Repairs being carried out as far a possible in dedicated repair areas.

- Refer to Schedule 2 of the Policy re live working.

Unattended Apparatus and Equipment

Refer to the University's Supervision and Unattended Equipment Policy UHSP/8/SSOHA/96.

Where ever possible electrical equipment should switched off and if possible isolated from the supply when left unattended for any period of time. However, sometimes equipment has to be left running when unattended. In these situations the following precautions should be taken:

- The equipment or apparatus should be designed to run safely unattended, to "fail-to-safety" and be readily shut down. 'Fail-to-safety' means that if the equipment or apparatus breaks down or fails in some way it does so to a safe condition.
- Any unattended running should be authorised by persons nominated by the Head of Budget Centre.
- Security, emergency and maintenance staff should have enough information on which to take appropriate action in an emergency. Such information should be displayed prominently on or near to the equipment.

Private Equipment in Halls of Residence

Portable electrical equipment in halls of residence belonging to residential staff or students does not need to be inspected and tested if it is used in their own rooms. However there is a duty on the owners to ensure that it is in a safe condition. Hall Managers should make arrangements to inform residential staff and students about the safe use of electrical equipment in halls. Points to include are:

- No overloading of sockets.
- Safe use of extension leads and plug boards.
- Not using damaged equipment.
- Using propriety equipment only.
- Using propriety 3 pin plugs only and not having exposed live wires, taped joints etc.

Arrangements should be made by Hall Managers to regularly check that the guidance is being followed.

Extension Leads and Socket Adaptors

Extension leads

An extension lead is a board of one or more sockets that is plugged into a single mains socket via a lead and normally a 13 amp plug (in some cases the lead is on a cable reel and the sockets are fitted into the side of the reel). The use of these extension leads other than for temporary use has always been discouraged. When new or refurbished offices, laboratories, workshops etc. are planned the number of electrical items and their position should be considered and a sufficient number of wall sockets provided.

However, it is recognised that there has been a large increase in the number of electrical items, especially information technology equipment, and that it is not always practicable to avoid the use of extension leads.

In order to ensure the safe use of extension leads the following precautions should be taken:

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- Wherever possible, the extension socket(s) and their leads should be permanently secured on walls or other fixed equipment.
- Where permanent fixing is not possible the extension sockets and lead should be positioned, preferably off the floor, so that they cannot be damaged (by people, equipment, machinery, furniture spillages of liquid etc.) and cannot cause a hazard (tripping etc.).
- Cable reel extension leads should be fully unwound in use (to avoid coils overheating).
- Extension lead should not normally be plugged one into another.
- The rating of fuse in the plug of an extension lead must be limited to the current rating of the cable used for the lead.
- The current used by equipment plugged into the extension lead should not exceed the rating of the mains socket outlet (usually 13 amps).

Socket Adaptors

A socket adaptor contains two to four sockets and is plugged directly into a mains socket.

Socket adaptors should not be used because:

- They are not normally fused and if two or more of an adaptor's sockets are used it is possible to draw a total current in excess of the rating of the mains current. This could lead to damage to the wiring of the building and a risk of fire.
- They protrude from wall sockets and can be easily knocked and can be damaged.

Protection

If a fault occurs in electrical equipment the main protection is provided by the fuse in the plug and/or the equipment. A residual current device (RCD) will also provide protection if one is fitted.

If a fuse blows or an RCD trips do not put higher rated fuses in or defeat the trip. Switch off, isolate the equipment and do not use it until the fault is rectified.

Fuses

The correctly rated fuse must be fitted. The greater the current used the higher the fuse rating required.

A fuse is designed to fail if a fault occurs and too high a current is drawn. The wire in the fuse will heat up and eventually melt thus breaking the electrical circuit. The primary purpose of the fuse is to prevent the wiring circuit overheating and causing a fire.

As a general rule 230v equipment rated up to 700 watts should be fitted with a 3 amp fuse and up to 1000 watts a 7 amp fuse. Higher rated equipment should have a 13 amp fuse.

Note: A fuse will not prevent electric shock.

Residual Current Device

An RCD will restrict the effect of an electric shock that a person may receive if a fault occurs on a piece of equipment. The RCD will detect the fault very quickly and will reduce the magnitude of the current that the person is exposed to. Typically RCDs limit the current to between 10-50mA and will trip out in 30ms. This is normally sufficient to prevent a fatal outcome from an electric shock.

Situations where an RCD should be used include all uses of equipment out of doors and indoors in wet or damp conditions, e.g. laboratories, kitchens, workshops etc.

An RCD may be used with an individual appliance, plugging into the mains supply between the supply and the equipment or may be part of the infrastructure.

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RCDs should be tested regularly for correct operation in accordance with the manufacturers' recommendations; (generally via an inbuilt test button).

It should be noted that an RCD only protects against faults to earth. Protection is not given for faults between live and neutral conductors.

**PUBLISHED GUIDANCE AND STANDARDS
THAT FORM THE BASIS FOR THIS POLICY AND GUIDANCE**

Memorandum of Guidance on the Electricity of Work Regulations 1989. HSR 25. Health and Safety Executive. Revised and reprinted 1998. ISBN 0717616029

Electricity at Work-Safe Working Practices, HSG 85. Second Edition. Health and Safety Executive. 2003. ISBN 0717621642

Maintaining Portable and Transportable Electrical Equipment HSG 107. Health and Safety Executive. Reprinted with amended references 1999. ISBN 0717607151

Code of Practice for In-Service Inspection and Testing of Electrical Equipment WR233. Institution of Electrical Engineers. 2001. ISBN 0852967764

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07.07.2003

APPENDIX 5

Lifting and Slinging

Personnel qualified to carry out lift lifting and slinging

A. Dunn
A. Yates
D. Checkley
A. Zentani
D. Tovey

Personnel qualified to drive a fork lift truck

D. Checkley
A. Zentani
W. Hay

Appendix 6

All users are to carry out a Fire Induction briefing before swipe access is granted. This briefing should be carried out by the supervisor.

The form can be found at:

https://www.intranet.bham.ac.uk/university/hsu/documents/hspolicy/4FS_F1.doc

A printed version is on the next page.

The University of Birmingham
INDUCTION FIRE BRIEFING CHECK LIST

The University Fire Safety Policy requires Heads of Budget Centres to arrange for new staff to have fire induction briefing on their first day at work. The points on the check list should covered.

Premises	Budget Centre
Name of new member of staff	
Occupation	Date

- | | |
|--|----------------------------------|
| Action to be taken on hearing the alarm explained | Tick
<input type="checkbox"/> |
| Fire alarm point, location shown & method of operation explained | <input type="checkbox"/> |
| Fire action notice, location shown & contents explained | <input type="checkbox"/> |
| Means of escape seen | <input type="checkbox"/> |
| Means of escape, clear of obstructions | <input type="checkbox"/> |
| Assembly point seen (where applicable) | <input type="checkbox"/> |
| Fire alarm system, brief explanation | <input type="checkbox"/> |
| Raising alarm without question or hesitation fully understood | <input type="checkbox"/> |
| Location of fire appliances | <input type="checkbox"/> |
| Location of fire doors and purpose explained | <input type="checkbox"/> |
| Rules on no smoking explained and understood | <input type="checkbox"/> |
| Particular fire risks in department pointed out | <input type="checkbox"/> |

Signature of new member of staff

Name of member of staff conducting training	Position
Signature	

This form should be completed in duplicate. One copy should be retained in the Budget Centre. The new member of staff should bring the other copy to the Office of Estate Management by when they collect their identity card.

Appendix 7

Before any practical work is carried out, a risk assessment must be carried out. This should be carried out by the user with the help of the supervisor, in order to identify hazards with an aim to reduce and control risks.

Some activities are low risk and can be covered by a generic risk assessment

More in depth activities may need a more detailed RA. In this event a written method statement may help to identify hazards. A RA form must also be filled in and reviewed periodically [every 12 months] or when the activity changes.

University guidelines and the forms can be found at;

<https://www.intranet.bham.ac.uk/university/hsu/documents/hsguidance/17RA.doc>

The form is appendix 2 in this document.

Hazard and Risk Assessment Summary

School/Dept

Location of Activity

Date of Assessment

Assessor

Activity Assessed
(Attach protocols)

Assessment of Hazard and Risk								Control Measures Required			
HAZARD (List only hazards from which there is a significant risk of serious harm under foreseeable conditions)	PERSONS AT RISK (See key, Indicate number)	PERSONAL HARM?			LIKELIHOOD of HARM?						
		F	Mj	Mn	Y	Pr	Po	R			

Key

PERSONS AT RISK	
Ug	Undergraduate
Pg	Postgraduate
S	Staff
C	Contractor
V	Visitor
Pa	Patient
Pu	General Public
Yp	Young Person
Nm	New/Expectant Mother

PERSONAL HARM?	
F	Fatality
Mj	Major Injury
Mn	Minor Injury

LIKELIHOOD	
Y	Yes/ Very High
Pr	Probable
Po	Possible
R	Remote

Risk Significance				
	Y	Pr	Po	R
F	✓	✓	✓	✓
Mj	✓	✓	✓	✓
Mn	✓	✓	X	X

✓ = Significant risk
X = Insignificant risk

Date for Review

Major Injury: Loss of or broken limb
 Loss of or damaged eye
 Loss of consciousness
 Acute illness needing medical treatment
 Permanent ill health or disability

Assessment of Hazard and Risk

Control Measures Required

HAZARD

(List only hazards from which there is a significant risk of serious harm under foreseeable conditions)

**PERSON
S AT
RISK** (See
key,
Indicate number)

**PERSON
AL
HARM?**

F Mj Mn

**LIKELIHOOD
of HARM?**

Y Pr Po R

HAZARD (List only hazards from which there is a significant risk of serious harm under foreseeable conditions)	PERSON S AT RISK (See key, Indicate number)	PERSON AL HARM?			LIKELIHOOD of HARM?				Control Measures Required
		F	Mj	Mn	Y	Pr	Po	R	

