

## SAFETY HEALTH ENVIRONMENT WORKCOVER AND SUSTAINABILITY (SHEWS) ELECTRICAL EQUIPMENT USE PROCEDURES

### PURPOSE

CQUniversity has an obligation under the Queensland Workplace Health and Safety and Electrical Safety legislation to provide a safe and healthy environment for all staff, contractors (and their staff) as well as CQUniversity students and visitors to University campuses and/or workplaces. While most business is conducted on University campuses, some activities are conducted off site. These procedures have been developed to provide a safe system of work to ensure that persons are free from injury or illness caused by exposure to electrical hazards in the workplace.

### PROCEDURE

This procedure applies to all CQUniversity staff, students, contractors (and their staff) as well as visitors to the University campuses and/or workplaces. It describes ways to identify and manage exposure to risks of injury and property damage caused directly or indirectly by electricity. It will provide information on electrical tasks carried out within CQUniversity workplaces and is designed to be used in conjunction with other CQUniversity procedures and safe work systems.

This document is based on specific legislative requirements as contained in Queensland Workplace Health and Safety, Electrical Safety legislation and AS/NZS 3760 In-Service Safety Inspection and Testing of Electrical Equipment. In addition to legislative requirements, the general principles of risk management should be applied to electrical hazards. These procedures outline the controls specific to certain hazards concerned with electrical safety.

### 1 Risk Management

The five basic steps in the workplace health and safety risk management process and the Electrical Safety Code of Practice 2010 - Risk Management must be followed to manage exposure to risks.

#### 1.1 Preparation

- Step 1** Identify all hazards.
- Step 2** Assess the risks these hazards create.
- Step 3** Decide on measures to control the risk.
- Step 4** Implement appropriate control measures.
- Step 5** Monitor the control measures and review the process.

## 2 Qualifications of Personnel

The purpose of the Queensland Electrical Safety Act 2002 is 'directed at eliminating the human cost to individuals, families and the community of death, injury and destruction that can be caused by electricity'. CQUniversity own and lease a diverse range of properties and facilities with a variety of electrical work carried out on these premises.

All electrical work on fixed wiring shall be undertaken by the CQUniversity Facilities Management Directorate (DFM) or their assigned agents and must comply with the requirements of the Queensland Electrical Safety Act and subordinate legislation relevant to the Act.

All electrical work at voltages in excess of extra low voltage (greater than 50 volts AC (RMS) or greater than 120 volts Ripple free DC) must only be carried out by electrical workers, licensed and competent. (*Queensland Electrical Safety Act 2002 - Section 55*)

- Persons holding a current and relevant Electrical Worker's Licence. The scope of work that holders of restricted certificates of competency can be permitted to perform is dependent on their level of certification.
- Electrical engineers as part of practicing their profession as an electrical engineer.
- Students of electrical work as part of the training and under the supervision of teaching staff deemed competent under the Electrical Safety Act 2002. For additional information on requirements for electrical licences consult the Queensland Electrical Safety Act 2002 - S55.

Note: Staff, undergraduate and postgraduate students who are not holders of relevant electrical licences must not undertake electrical work, other than the removal or installation of computer circuit boards in machines where the removal of the cover or housing does not give access to any mains potential voltage. Alternatively such work was intended by the equipment manufacturer to be performed by users.

## 3 Electrical Appliances

When electrical equipment is purchased, the supplier of the equipment is deemed to be responsible for the initial electrical safety of the equipment. However once purchased the owner of the equipment now becomes the person in control of the equipment and has a legal obligation to ensure it is electrically safe. To assist the University in managing this obligation it has installed various processes to assist in maintaining a safe work place. These include:

- appropriate licensing of electrical trades staff and contractors;
- installation of residual current devices (RCD) on the majority of the power circuits within the University;
- mandatory testing of these RCD's;
- analysis of the risk associated with all electrical equipment prior to it being used in the workplace. e.g. extension leads, portable outlet devices and electrical equipment used in laboratories, workshops and kitchens;
- testing and tagging of specific electrical equipment;
- formal in-house electrical safety procedures.

All electrical equipment that is to be used in areas such as labs, workshops and kitchens shall be inspected and tested to ensure the equipment is safe prior to being used in the workplace. The test and tag requirements for this equipment and specified electrical equipment such as extension leads and portable outlet devices will depend on the class of work for which the item is being used and will be tested as required by Queensland Electrical Safety Legislation and AS/NZS 3760.

CQUniversity Facilities Management Directorate (DFM) shall ensure that a record of all registered specified electrical equipment and electrical equipment used in high risk areas such as laboratories, workshops and kitchens is maintained and all registered equipment is tested and tagged with a current 'test tag' in accordance with this procedure. Only persons who have been assessed as competent to carry out electrical testing and approved by DFM will be permitted to carry out the activity.

### 3.1 Electrical Safety Fundamentals

- Electrical equipment shall only be used for its designed purpose.
- Electrical installations, equipment or extension leads should be protected by appropriate covers or barriers if they are likely to be damaged by vehicles, other machinery or heavy people traffic.
- Access to CQUniversity electrical switch boards and the resetting of circuit breakers is restricted to DFM electricians and approved electrical contractors. Any reports of tripped circuits and requests for the resetting of tripped circuits must be directed to the DFM electrical supervisor.
- Electrical heating appliances are a common cause of fires. Equipment with exposed heating elements that can come into contact with combustible materials must not be used (e.g. bar radiators). Where possible appliances should have thermostat control and thermal overload protection and shut the equipment off when they fail (i.e. "failsafe").

### 3.2 Double Adaptors and Piggy-Back Plugs

The use of double-adaptors is prohibited within CQUniversity. They are to be removed from the workplace as they are particularly prone to the connections working loose. This has the potential for them to overheat or for persons to come into contact with live terminals. Computer equipment that has moulded piggybacked plugs already fitted, as part of manufacture will be permitted, however no retrofitting of piggybacked plugs is permitted.

### 3.3 Multi-Outlet Power Boards/Electric Portable Outlet Device (EPOD)

Multi-outlet power boards or electric portable outlet devices (EPOD) are categorised under Queensland legislation as specified electrical equipment and are to be tested as per the appendix of this document. EPOD's should include a 10amp current overload protection and individual switches for each power outlet. In laboratories, kitchens and workshops, boards must be securely mounted clear of the workbench or floor. EPOD's are not waterproof and should not be used in wet areas or where there is a possibility of water or moist conditions coming into contact with the fitting.

'Gang coupling' or 'daisy chain' of EPOD's (as illustrated) allow the potential for a greater number of appliances to draw large amounts of power from the power boards, creating a potential overheating hazard or fire and therefore is **PROHIBITED**.

EPODS are not to be used for high current devices such as room AC units or heaters, fridges, freezers, urns, microwaves or hot water jugs. To control the potential for abuse of these items, periodic reviews by managers of work areas should be undertaken to determine any risk associated with their use.



### 3.4 Electrical Extension Leads/Cord Set or Cord Extension Set

Cord extension sets are also categorised as specified electrical equipment and are to be tested as per the appendix and would be used for short-term applications only. In addition to periodic testing, users should check to see whether the cord extension set has a current test tag and whether the plug and socket are properly secured to the cord and that there are no cuts or tears in the outer insulation, prior to use.

Cord extension sets must be the appropriate length and current rating for the intended application as significant amounts of heat can be generated by electricity usage which may lead to fires, especially if the current rating for the cord extension set is exceeded. If a cord extension set is not fit for its intended use, or it does not have a current test tag, then it shall not be used and shall be withdrawn from service until its functionality is restored.

Coiling of cord extension sets or placing them under mats or rugs could intensify the heating effect. Ensure that cord extension sets are fully extended when in use and are not placed where they could be a tripping hazard (eg. across aisles, corridors or other trafficable areas).

### **3.5 Electrical Equipment in Hazardous Atmospheres and Wet Areas**

The risk associated with electrical installations in hazardous atmospheres and wet areas must be undertaken by CQUniversity management prior to any installation taking place. Standard electrical switches, motors, lights and other equipment may act as ignition sources or become live if they are affected by moisture or water.

Formal risk assessments conducted by the faculty/school management will identify the potential for these situations to arise. DFM staff shall be consulted prior to any changes/alterations being conducted. All electrical equipment and wiring for use in an explosive atmosphere and wet areas must meet the requirements of AS/NZS as applicable.

### **3.6 New Equipment**

Queensland electrical safety legislation places legal obligations on certain people to ensure the piece of equipment is electrically safe. They include designers, manufacturers, importers, installers, repairers, suppliers, employers and persons in control of electrical equipment. Under normal circumstances when a new piece of equipment is purchased, the supplier of the equipment is deemed to be responsible for ensuring the new equipment is electrically safe. However once purchased, the owner of the equipment becomes the person in control of the electrical equipment and assumes the responsibility to ensure it is electrically safe.

At this initial purchase time the piece of electrical equipment may not be fitted with a formal electrical 'test tag' and the piece of equipment should be visually examined by the purchaser for obvious damage prior to it being put into service.

All new electrical equipment that is to be used in areas such as laboratories, workshops and kitchens or which is defined as specified electrical equipment dependent on the class of work for which the item is being used, will be inspected and tested prior to being used in the workplace. In addition, any new equipment deemed by the area supervisor to require ongoing testing as a result of a risk assessment, will ensure the equipment is tested and tagged and recorded on a register to determine the initial test date and subsequent testing frequency thereafter. Only persons who have been assessed as competent to carry out electrical testing and approved by DFM or their assigned agents shall be permitted to carry out the activity.

DFM will forward notification to all area supervisors on an annual basis to conduct a visual inspection of the areas under their control. This inspection will establish if the area usage has changed and if any electrical equipment has sustained any visible damage to its exterior.

### **3.7 Personal Electrical Equipment**

Electrical inspection and testing of personal electrical equipment is required as per the appendix of this document. Use of personal electric equipment at CQUniversity is to be approved by the Head of Department and the cost associated with inspection and testing of that equipment would be the responsibility of the department.

### **3.8 Sale or Disposal of Second Hand Electrical Equipment**

All electrical equipment that is found to be surplus to the University's needs and is to be offered for sale or removal will need to comply with the Electrical Safety Regulations 2002, Section 122 and 124 regarding the sale of second hand electrical equipment.

All electrical equipment to be discarded (e.g. dumped or used for parts) by the University must first be rendered inoperable i.e. the electrical supply cord is to be removed to prevent use and the item must be disposed of in a manner to discourage retrieval.

### **3.9 Hiring of Electrical Equipment**

CQUniversity will only hire electrical equipment from reputable external hire companies. The electrical equipment must have a current electrical test tag attached to the equipment, prior to receipt from the hire company, and must be current for the expected duration of the hire.

All electrical equipment that is hired by CQUniversity to students, staff and others must be tested and tagged by a competent person appointed by the department / school responsible for conducting the hiring. The mandatory testing interval is as per the appendix of this document. If the competent person appointed by the department / school responsible for conducting the hiring decides the piece of electrical equipment is not safe, then a durable 'out of service' tag will be attached and the item will be immediately withdrawn from use. The department / school responsible for hiring out the electrical equipment will keep records of these tests conducted for a period of five years.

### **3.10 Testing of Residual Current Devices/Safety Switches**

Residual current devices (RCD's) are required for specified electrical equipment in workshops, laboratories, construction sites and other outdoor areas and offer an additional means of protection against electrocution. The intervals for testing and inspection of RCD's are in accordance with AS/NZS 3760. DFM staff will organise a competent electrical worker to conduct all testing on switchboard mounted RCD's/Safety Switches.

## **4 Performance of Live Electrical Work**

Live electrical work will not be conducted on any plant, machine or fixed installation at CQUniversity unless the circumstances comply with all of the requirements of the Electrical Safety Regulations 2002. This includes a formal risk assessment of the task, appropriate training of the staff involved, provision of any personal protective equipment, suitable equipment for isolation and written permission to conduct the task from the DFM electrical contract holder.

The Electrical Safety Code of Practice 2010 - Working Near Exposed Live Parts gives some guidance on how to meet these obligations.

## **5 Reporting of Electrical Incidents**

Every electrical incident that results in either a person being injured or that has the potential to cause injury, will be immediately reported to the workplace supervisor who will assess the situation and put into place any immediate corrective actions to ensure the safety of individuals, preservation and security of the site for inspectors or police.

The person who reported the incident and the workplace supervisor are responsible to:

- During normal work hours, to notify Campus Security or the Campus Facilities Coordinator or their representative of the incident, who will ensure the area and all personnel in the immediate area are safe:

- Bundaberg/Noosa – Phone 7076 or mobile 0417 795 607
- Emerald advise the Campus Operations and Projects Manager of the Emerald Learning Centre – mobile 0409 191 561
- Gladstone – Phone 7277 or mobile 0408 753 608
- Mackay – Phone 7437 or 0418 721 236
- Rockhampton – Phone 1331 or mobile 0418 792 982
- After hours advise Campus Security of the incident:
  - Bundaberg – Phone 1331 or mobile 0418 788 260
  - Emerald advise the Campus Operations and Projects Manager of the Emerald Learning Centre – mobile 0409 191 561
  - Gladstone – Phone 1331 or mobile 0418 792 982
  - Mackay – Phone 1331 or mobile 0418 792 982
  - Noosa – Phone 1331 or mobile 0418 792 982
  - Rockhampton – Phone 1331 or mobile 0418 792 982

The Facilities Coordinator, Campus Security or the Emerald Campus Operations and Projects Manager will immediately advise the CQUniversity DFM Electrical Supervisor or their representative and the Manager, Health, Safety, Environment and Training of the incident. The DFM Electrical Supervisor will conduct the preliminary investigation and initiate the immediate corrective actions to eliminate the risk. These corrective actions could include conducting immediate repairs, engaging a licensed electrical contractor and notifying Workplace Health and Safety Queensland and the area Electricity Authority. The DFM Electrical Supervisor and the Manager, Health, Safety, Environment and Training will investigate and compile the necessary incident reports.

Serious electrical incidents or dangerous electrical incidents as defined under the Queensland legislation can occur at the workplace and CQUniversity has established this reporting procedure to ensure safety of staff and compliance with this legislative requirement.

## DEFINITIONS

All terminology used within this Procedure is consistent with definitions in the [CQUniversity Glossary](#) . In addition, the following terms and definitions are relevant to this specific procedure.

**Class 1 Equipment: (basic insulated, protectively earthed equipment):** Equipment in which protection against electric shock does not rely on basic insulation only, but which includes an additional level of protection, in that conductive accessible parts are connected to the protective earthing conductor in the fixed wiring of the installation in such a way that those accessible parts cannot become live in the event of a failure of the basic insulation.

### NOTE:

- 1 Class I equipment may have parts with double insulation or parts operating at extra-low voltage.
- 2 This provision includes a protective earthing conductor as part of the flexible cord or flexible cable for equipment intended for use with a flexible cord or flexible cable.
- 3 Other classes are described in AS/NZS 60335.1. (AS/NZS 3760:2010)

**Class II Equipment: (double insulated equipment):** Equipment in which protection against electric shock does not rely on basic insulation only, but in which an extra layer of insulation (called 'supplementary insulation') is

provided to give double insulation, there being no provision for protective earthing or reliance upon installation conditions. This equipment is generally manufactured with a non-conductive (insulated) enclosure, and is marked either with the words 'DOUBLE INSULATED' or with the symbol to allow easy identification.

**NOTE:**

- 1 Class II equipment may also be manufactured with metal enclosures which are double insulated from live parts.
- 2 Class II equipment may be provided with an earth connection for purposes other than safety. This earth connection is referred to as a functional earth (FE). Functionally earthed parts are double insulated from live parts. (AS/NZS 3760:2010)

**Competent Person:** A person who has acquired, through training, qualifications, experience or a combination of these, the knowledge and skill enabling the person to inspect and test electrical equipment. (*Electrical Safety Regulations 2002*)

**Construction Work:** Construction work is work to erect, construct, extend, alter, convert, fit-out, commission, renovate, repair, refurbish, disassemble or decommission a structure, or part of a structure or:

- a work connected with site preparation, excavation and landscaping for work mentioned above; or
- b the assembly or installation of prefabricated components to form a structure, or part of a structure, for work mentioned above; or
- c the disassembly of prefabricated components for work mentioned above that, immediately before the disassembly, formed a structure or part of a structure; or
- d an activity that is a prescribed activity (*Workplace Health and Safety Act 1995*).

**Construction Wiring:** Temporary electrical wiring by which electricity is supplied by an electrical entity for use in and for the period of construction work within the meaning of the WH&S Act. (*Electrical Safety Regulations 2002*)

**Cord Extension Set:** An assembly of a plug intended for connection to a socket outlet; and a sheathed flexible cord; and a cord extension socket. (*Electrical Safety Regulations 2002*)

**Dangerous Electrical Event:** Is any of the following:

- a the coming into existence of circumstances in which a person is not electrically safe, if:
  - the circumstances involve high voltage electrical equipment; and
  - despite the coming into existence of the circumstances, the person does not receive a shock or injury;
- b the coming into existence of the following circumstances:
  - if a person had been at a particular place at a particular time, the person would not have been electrically safe;
  - the person would not have been electrically safe because of circumstances involving high voltage electrical equipment;
- c an event that involves electrical equipment and in which significant property damage is caused directly by electricity or originates from electricity;
- d the performance of electrical work by a person not authorised under an electrical work license to perform the work;
- e the performance of electrical work by a person if, as a result of the performance of the work, a person or property is not electrically safe;

Examples :

- the connection of electrical equipment to a source of supply involving incorrect polarity or other incorrect connection;
  - the performance of electrical work as a result of which an exposed wire is left in circumstances in which it can be energised by the operation of a switch or circuit breaker or the insertion of a fuse.
- f the discovery by a licensed electrical worker of electrical equipment that has not been marked as required under this Act. (*Electrical Safety Act 2002*)

**Electrical Equipment:** Any apparatus, appliance, cable, conductor, fitting, insulator, material, meter or wire:

- a used for controlling, generating, supplying, transforming or transmitting electricity at a voltage greater than extra low voltage; or
- b operated by electricity at a voltage greater than extra low voltage;
- c operated by electricity at an extra low voltage, if the equipment forms part of an electrical installation located in a hazardous area; or
- d that is, or that forms part of, a cathodic protection system. (*Electrical Safety Act 2002*)

**Electrical Risk:** In relation to a person, the risk to the person of death, shock or injury caused directly by electricity or originating from electricity; or in relation to property, the risk to the property of:

- a damage caused by a cathodic protection system; or
- b loss or damage caused directly by electricity or originating from electricity. (*Electrical Safety Act 2002*)

**Electrically Safe:** means:

- a for a person or property, that the person or property is free from electrical risk; and
- b for electrical equipment or an electrical installation, that all persons and property are free from electrical risk from the equipment or installation; and
- c for the way electrical equipment, an electrical installation or the works of an electricity entity are operated or used, that all persons and property are free from electrical risk from the operation or use of the equipment, installation or works; and
- d for the way electrical work is performed, that all persons are free from electrical risk from the performance of the work; and
- e for the way a business or undertaking is conducted, that all persons are free from electrical risk from the conduct of the business or undertaking; and
- f for the way electrical equipment or an electrical installation is installed or repaired, that all persons are free from electrical risk from the installing or repairing of the equipment or installation. (*Electrical Safety Act 2002*)

**Electrical Safety:** For a person or property, means the person or property is electrically safe. (*Electrical Safety Act 2002*)

**Electrical Work:** The manufacturing, constructing, installing, testing, maintaining, repairing, altering, removing or replacing of electrical equipment. (*Electrical Safety Act 2002*)

**Extra Low Voltage:** Voltage of 50V or less AC RMS, or 120V or less ripple-free DC. (*Electrical Safety Act 2002*)

**Fixed Wiring:** The electricity supply to a building and includes, all switchboards, distribution boards and high voltage apparatus, as well as the installed wiring to switches, socket outlets and light fittings.

**Live Work:** Electrical work performed in circumstances in which some or all of the electrical equipment, the subject of the electrical work, is energised. (*Electrical Safety Regulations 2002*)

**Low Voltage Supply:** Voltage greater than extra low voltage, but not more than 1000V AC RMS or 1500V ripple-free DC. (Electrical Safety Act 2002)

**Personal Electric Equipment:** Any privately owned electrical equipment of the plug-in type to be used at the University. Examples include radios, electric heaters, and fans, sandwich maker, coffee makers and mobile phones (University of Wollongong – Electrical Safety Guidelines)

**Safety Switch:** A Type 1 or a Type 2 safety switch. (*Electrical Safety Regulations 2002*)

**Serious Electrical Incident:** is an incident involving electrical equipment if, in the incident:

- a a person is killed by electricity; or
- b person receives a shock or injury from electricity, and is treated for the shock or injury by or under the supervision of a doctor; or
- c a person receives a shock or injury from electricity at high voltage, whether or not the person is treated for the shock or injury by or under the supervision of a doctor. (*Electrical Safety Act 2002*)

**Specified Electrical Equipment:**

- a for the performance of amusement work, manufacturing work or rural industry work, the following equipment (other than an amusement device or amusement ride):
  - i a cord extension set with a current rating of not more than 20 amps;
  - ii an electrical portable outlet device with a current rating of not more than 20 amps;
  - iii electrical equipment, other than a portable safety switch, that has a current rating of not more than 20amps; and is connected by a flexible cord and plug to low voltage supply; and
- b for the performance of office work or service work:
  - i a cord extension set with a current rating of not more than 20 amps; or
  - ii an electrical portable outlet device with a current rating of not more than 20 amps; or
  - iv electrical equipment, other than a portable safety switch, that has a current rating of not more than 20 amps; and is connected by a flexible cord and plug to low voltage supply; and
  - iii is moved during its normal use for the purpose of its use.

(*Electrical Safety Act 2002*)

## RESPONSIBILITIES

The Manager, Health, Safety, Environment and Training is responsible for ensuring these procedures are followed.

## RECORDS

All records relevant to these procedures are to be maintained in a recognised University recordkeeping system in accordance with the Queensland State Archives Retention and Disposal Schedule.

## DOCUMENTATION

Queensland Parliamentary Counsel, *Workplace Health and Safety Act 1995*, Reprint No 9D [on line]  
<http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/W/WorkplHSaA95.pdf> [Accessed October 2010]

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<http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/E/ElectricalSA02.pdf> [Accessed October 2010]

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Queensland Department of Justice and Attorney General, Plant Code of Practice Plant  
[http://www.deir.qld.gov.au/workplace/resources/pdfs/plant\\_code.pdf](http://www.deir.qld.gov.au/workplace/resources/pdfs/plant_code.pdf) [Accessed October 2010]

Queensland Department of Justice and Attorney General, *Electrical Safety Code of Practice 2010 - Risk Management*, [http://www.justice.qld.gov.au/\\_data/assets/pdf\\_file/0015/25404/cop-risk-management.pdf](http://www.justice.qld.gov.au/_data/assets/pdf_file/0015/25404/cop-risk-management.pdf)  
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Queensland Department of Justice and Attorney General, *Electrical Safety Code of Practice 2010 - Electrical Work*  
[http://www.justice.qld.gov.au/\\_data/assets/pdf\\_file/0007/8917/cop-electrical-work.pdf](http://www.justice.qld.gov.au/_data/assets/pdf_file/0007/8917/cop-electrical-work.pdf) [Accessed October 2010]

## REFERENCES

- The University of Queensland – Electrical Safety Management Plan.
- University of Wollongong – Electrical Safety Guidelines.
- AS/NZS 3760 – In-Service Safety Inspection and Testing of Electrical Equipment.

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Related Documents	<a href="#">Plant Isolation, Safety Tag and Lockout Procedures</a> <a href="#">Safety Health Environment Workcover and Sustainability (SHEWS) Working with Electricity Procedures</a>