

### IMPLEMENTATION

#### Aim

To prescribe the responsibilities and actions required for the electrical safety management of equipment/installations owned, controlled or located on University premises and/or during University-related activities, to ensure the University meets the requirements of the Health, Safety and Wellbeing (HSW) Policy and the relevant sections of the [Work Health and Safety \(WHS\) Act 2012 \(SA\)](#), [WHS Regulations 2012 \(SA\)](#) and Code of Practice [Managing electrical risks in the workplace 2020 \(SA\)](#).

#### 1 Objectives

##### 1.1 To ensure that:

- the electrical hazards associated with electrical equipment and installations are identified and assessed; and
- the appropriate control measures are in place to prevent injury and/or minimise the risk of exposure to electrical hazards in accordance with the HSW Handbook chapter [Hazard Management](#).

#### 2 Scope and application

##### 2.1 Inclusions

This process applies to:

- all workers who undertake University of Adelaide related activities, use University of Adelaide facilities and/or are employed or engaged by the University or affiliated with the University in any capacity; and
- the electrical equipment and electrical installations that are under the control of the University.

##### 2.2 Exclusions

This chapter does not apply to:

- the design, manufacture and supply of electrical equipment. Refer to the HSW Handbook chapter [“Plant/equipment safety management”](#) for hazard management and legislative requirements.

##### 2.3 Construction and demolition sites

Additional duties apply for the design, construction and testing of electrical installations on construction and demolition sites. Refer to [WHS Regulation SA \(2012\) Section 163, 164A](#) and [AS/NZS 3012:2010 “Electrical installations – Construction and demolition sites”](#) for specific requirements.

##### 2.4 Electrical installations – Battery systems for use with power conversion equipment

Additional duties apply. For specific requirements refer to [AS/NZS 5139 \(2019\)](#) “Electrical installations – Safety of battery systems for use with power conversion equipment”. This standard sets out general installation and safety requirements, where the battery system is installed and is connected with power conversion equipment, to supply electric power to other parts of an electrical installation. The standard also outlines the potential hazards and installation methods that minimise the risks.

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2 Scope (Continued)

2.5 **Solar (Photovoltaic) Systems** (i.e. a unit that converts energy from sunlight into electrical energy) Additional duties apply. The installation must comply with the following [standards](#):

- AS/NZS 5033 Installation and safety requirements for photovoltaic (PV arrays) (includes testing)
- AS/NZS 1170.2 Structural Design Actions Part 2: Wind Actions
- AS/NZS 4509.1 Stand-alone Power Systems Part 1: Safety and Installation
- AS/NZS 3000:2018 Electrical installations
- AS/NZS 1768:2007 Lightning protection
- AS/NZS 4777.1:2016 Grid Connection of Energy Systems via Inverters – installation requirements
- AS 4086.2 Secondary Batteries for Use with Stand-alone Power Systems Part 2: Installation and Maintenance

3 Process: Hazard management

| Person Responsible  | Actions   |
|---|---|
| <p>3.1 <b>Supervisor/Person in control of the area/activity</b></p> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure that the reasonably foreseeable hazards associated with electrical equipment/installations in your area(s) of control, are identified and managed (i.e. the risk to health and safety is eliminated or minimised) in accordance with the HSW Handbook chapter "<a href="#">Hazard Management</a>". [Refer to Appendix A for <a href="#">Examples of specific hazards and control measures</a> and Appendix C for requirements for <a href="#">Residual Current Devices (RCD)</a>.]</li> <li><input type="checkbox"/> Ensure workers in your area(s) of supervision/control implement the safety control measures identified on the risk assessment.</li> <li><input type="checkbox"/> Review the control measures, in consultation with the <a href="#">local Health Safety and Wellbeing Officer (HSWO)</a> and any other relevant workers, in accordance with the HSW Handbook chapter <a href="#">Hazard Management</a> and/or <a href="#">Incident investigation</a> where applicable) if:                         <ul style="list-style-type: none"> <li><input type="checkbox"/> a new/previously unforeseen hazard has been introduced; or</li> <li><input type="checkbox"/> there is a safety issue or an incident/injury occurs; or</li> <li><input type="checkbox"/> requested by a Health and Safety Representative; or</li> <li><input type="checkbox"/> new legislation is introduced; or</li> <li><input type="checkbox"/> new information becomes available which could eliminate or minimise the risk.</li> </ul> </li> </ul> <p><b>Electrical work on energised electrical equipment – when permitted</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure electrical work on energised electrical equipment is prohibited, unless:                         <ul style="list-style-type: none"> <li><input type="checkbox"/> one or more of the exceptions specified under the <a href="#">WHS Regulation</a> section 157 applies;</li> <li><input type="checkbox"/> the work is authorised and completed by a registered <a href="#">electrical worker</a> (see definitions); and</li> <li><input type="checkbox"/> the work is carried out in accordance with the <a href="#">WHS Regulations</a> Division 4 sections 152 – 162). This includes the requirement for:                                 <ul style="list-style-type: none"> <li><input type="checkbox"/> a risk assessment and safe work method statement;</li> <li><input type="checkbox"/> a safety observer to be present who is competent to implement control measures in an emergency and rescue/resuscitate the worker who is carrying out the work if necessary in accordance with <a href="#">WHS Regulation</a> section 161.</li> </ul> </li> </ul> </li> <li><input type="checkbox"/> Ensure hazard management records are kept in accordance with the University's requirements as outlined in <a href="#">Faculty/Division/School/Branch/Area Records, (Appendix E)</a>. (Noting the University's requirements exceed the requirements outlined in the WHS Regulations section 162.)</li> </ul> |

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3 Process: Hazard management (Continued)

| Person Responsible                                      | Actions   |
|---|---|
| 3.2 All persons identified in the scope of this process | <ul style="list-style-type: none"> <li><input type="checkbox"/> Undertake <a href="#">hazard management</a> in accordance with the HSW Handbook chapter and assist in any hazard management process where required/requested by your Supervisor/Person in control of the activity/area.</li> <li><input type="checkbox"/> Implement safety control measures in accordance with:                             <ul style="list-style-type: none"> <li><input type="checkbox"/> the manufacturer’s instruction; and/or</li> <li><input type="checkbox"/> documented Risk Assessments and Safe Operating Procedures (where required by the Risk Assessment); and</li> <li><input type="checkbox"/> any information/instruction/training provided.</li> </ul> </li> </ul> |

4 Process: Identification of training needs and provision of information, instruction, training and supervision

| Person Responsible                                      | Actions   |
|---|---|
| 4.1 Supervisor/Person in control of the area/activity   | <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure that the training needs of workers are identified in accordance with the <a href="#">HSW Training Plan</a> chapter of the HSW Handbook including the requirement for any licences under the <a href="#">WHS Regulations 2012 (SA)</a> and other relevant legislation.</li> <li><input type="checkbox"/> Ensure that all workers under your supervision are provided with the relevant level of information/instruction/training before they undertake the task, in accordance with their Training Plan and the HSW Handbook chapter “<a href="#">Provision of information, instruction and training</a>”.</li> <li><input type="checkbox"/> Ensure the appropriate level of supervision is provided, based on the skill/proficiency/competency of the worker(s) and the level of risk.</li> </ul>  |
| 4.2 All persons identified in the scope of this process | <ul style="list-style-type: none"> <li><input type="checkbox"/> Follow reasonable instructions and use any electrical equipment and/or conduct electrical work in accordance with the information, instruction and training provided by your supervisor/person in control of the area/activity and your licence (where required).</li> </ul> <p>If you are a registered <a href="#">electrical worker</a> and are required to undertake <a href="#">electrical work</a>:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure you are licenced in accordance with the <a href="#">Plumbers, Gas Fitters and Electricians Act 1995 (SA)</a>;</li> <li><input type="checkbox"/> Only undertake the kind of work authorised by the licence;</li> <li><input type="checkbox"/> Ensure you inform your Supervisor/Person in control of the activity if there is a change to the conditions of your licence.</li> </ul> |

5 Process: Tools and equipment (includes ladders, scaffolds, insulating barriers and insulating mats)

| Person Responsible                                    | Actions   |
|---|---|
| 5.1 Supervisor/Person in control of the area/activity | <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure that all tools, instruments, equipment and Personal Protective Equipment (PPE) when selected, are suitable for purpose (e.g. adequately insulated), regularly inspected and maintained according to manufacturer’s instructions.</li> <li><input type="checkbox"/> Ensure any equipment used for detecting an energised source is trialled immediately before and after the testing to ensure that it is functioning correctly.</li> </ul> |

6 Process: Inspecting and testing electrical equipment

| Person Responsible   | Actions   |
|--|---|
| <p>6.1 Supervisor/person in control of the area/activity</p> | <ul style="list-style-type: none"> <li>□ Ensure that electrical equipment is regularly inspected and tested by a <a href="#">competent person for electrical work on energised electrical equipment or energised electrical installations</a> (see definitions) where the equipment is:                             <ul style="list-style-type: none"> <li>□ supplied through an electrical socket outlet;</li> <li>□ used in an environment in which the normal use of electrical equipment exposes the equipment to operating conditions that are likely to result in damage to the equipment or a reduction in its expected life span (e.g. conditions that involve exposure to moisture, heat, vibration, mechanical damage, corrosive chemicals or dust.);</li> <li>□ a Residual Current Device (RCD).</li> </ul> </li> </ul> <p>Refer to <a href="#">Electrical Inspection and Testing: Decision Tool</a> (Appendix B.1) for a decision tool to assist determine where electrical testing is or is not required. Refer to <a href="#">Electrical Inspection and Testing: Intervals</a> (Appendix B.2). for inductive testing and inspection intervals for different types of environment and/or equipment.</p> <ul style="list-style-type: none"> <li>□ Ensure that where testing is required and the testing has not been completed that the equipment is not used until testing has taken place.</li> <li>□ Ensure that a record of any testing is kept in accordance with the University’s records management requirements (Refer to <a href="#">Faculty/Division/School/Branch/Area Records</a>, (Appendix E)</li> <li>□ Ensure where a contractor is engaged to inspect or test electrical equipment the processes in the HSW Handbook Chapter <a href="#">Contractor Safety Management</a> are followed.</li> </ul> <p><b>Failed items</b></p> <ul style="list-style-type: none"> <li>□ Ensure any failed items are dealt with as soon as reasonably practical. The item must be either be:                             <ul style="list-style-type: none"> <li>□ Tagged out using an Out of Service tag (refer to <a href="#">Isolation, locking off and access (Including tagging)</a> - Appendix D) until remedial action has been taken; or</li> <li>□ Decommissioned and disposed of (refer to <a href="#">Plant/Equipment Safety Management</a> handbook chapter, Electrical testing and inspection (Appendix H)).</li> </ul> </li> <li>□ Ensure any corrective action(s) arising from the inspection and testing is entered into the University’s <a href="#">online safety system</a> or an equivalent system (database) that meets the objectives of the <a href="#">Corrective action</a> HSW Handbook chapter. (i.e. a system that enables the recording, assigning and monitoring of actions to completion, within designated time-frames.)</li> </ul> |

7 Process: [Electrical Installations](#) (e.g. fixed electrical equipment, power points, cabling, ceiling lights, distribution boards)

| Person Responsible   | Actions  |
|--|--|
| <p>7.1 Supervisor/person in control of the area/activity</p> | <ul style="list-style-type: none"> <li>□ Ensure that any changes to the infrastructure (e.g. new power-points, hard-wiring of electrical equipment) are arranged by <a href="#">Infrastructure Branch</a>.</li> <li>□ Ensure that re-setting of all fixed circuit breakers and residual current devices is arranged through the Infrastructure Branch or in commercial properties through the Property Manager.</li> </ul> |

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7 Process: [Electrical Installations](#) (Continued)  
(e.g. fixed electrical equipment, power points, cabling, ceiling lights, distribution boards)

| Person Responsible |  | Actions  |
|--------------------|--|--|
| 7.2                | Executive Director Infrastructure                                    | <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure systems are in place for the safe management and operation of electrical installations in accordance with <a href="#">AS/NZS 3000 (2007) Electrical installations – (known as the Australian/New Zealand Wiring Rules)</a> and any other Australian Standards called up by AS/NZS 3000.</li> </ul>  |
| 7.3                | Person engaging a contractor (i.e. the person managing the contract) | <p>Where a contractor is required to install, operate, maintain, clean, test or dispose of an electrical installation or conduct electrical work on any installation:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Follow the processes in the HSW Handbook Chapter <a href="#">Contractor Safety Management</a>;</li> <li><input type="checkbox"/> Ensure the contractor has appropriate systems in place for isolation, locking off, access and tagging as part of the risk assessment.</li> <li><input type="checkbox"/> Notify the relevant University workers (e.g. Supervisor/person in control of the area) if:                             <ul style="list-style-type: none"> <li><input type="checkbox"/> the work requires a service isolation;</li> <li><input type="checkbox"/> the work has identified faulty/unsafe equipment;</li> <li><input type="checkbox"/> an installation has been tagged out with a “Danger Tag” (refer to <a href="#">Isolation, locking off and access (Including tagging)</a> - Appendix D) as part of the work process and where it impacts on the operations of the area.</li> </ul> </li> </ul> |

8 Process: Reporting and investigation of electrical incidents, injuries or a dangerous occurrence

| Person Responsible |   | Actions   |
|--------------------|---|---|
| 8.1                | Workers (e.g. staff, title-holders, volunteers, contractors) and students | <ul style="list-style-type: none"> <li><input type="checkbox"/> Report, if you have concerns that the activity or electrical equipment/installation may place you or any other person at risk of injury:                             <ul style="list-style-type: none"> <li><input type="checkbox"/> to the Supervisor/Person in control of the activity/area: and/or</li> <li><input type="checkbox"/> to your local <a href="#">HSW Team</a>; or</li> <li><input type="checkbox"/> to a <a href="#">Health and Safety Representative</a>; and</li> <li><input type="checkbox"/> using the <a href="#">on-line reporting system</a> to ensure an accurate record of the issue is recorded including the follow-up action taken.</li> </ul> <p>(e.g. cracks, cuts or abrasions on cables, wires and cords or damaged power outlets/insulation or a wet working environment when using powered equipment)</p> </li> <li>For incidents relating to an electric shock (see section 8.3):                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Contact the emergency services (0)000 for a life-threatening emergency;</li> <li><input type="checkbox"/> your local First Aider (as listed on your first aid point/hub) to ensure immediate emergency medical assistance is provided; and</li> <li><input type="checkbox"/> Security on 831 <b>35444</b>.</li> </ul> </li> </ul> |
| 8.2                | Supervisor/Person in control of the area/activity                         | <ul style="list-style-type: none"> <li><input type="checkbox"/> Follow up all reports of any concerns or faulty equipment and assist in the incident investigation in accordance with the “<a href="#">Report a safety issue or incident HSW handbook chapter</a>”.</li> <li><input type="checkbox"/> Ensure that any unsafe electrical equipment is:                             <ul style="list-style-type: none"> <li><input type="checkbox"/> disconnected; or</li> <li><input type="checkbox"/> isolated from its electricity supply.</li> </ul> </li> </ul>   |

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8 Process: Reporting and investigation of electrical incidents, injuries or a dangerous occurrence (Continued)

| Person Responsible  | Actions  |
|---|--|
| <p><b>8.2 Supervisor/Person in control of the area/activity</b></p> <p>(Continued)</p>                                      | <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure that once it has been disconnected, it is not:                             <ul style="list-style-type: none"> <li><input type="checkbox"/> reconnected until it is repaired or tested and found to be safe by a <a href="#">competent person</a>, for the purposes of carrying out inspection and testing of electrical equipment (see definitions); or</li> <li><input type="checkbox"/> is replaced; or</li> <li><input type="checkbox"/> permanently removed from use.</li> </ul> </li> <li><input type="checkbox"/> Ensure unsafe electrical equipment is labelled indicating it is unsafe and not be used i.e. by using an Out of Service tag. (refer to <a href="#">Isolation, locking off and access (Including tagging)</a> - Appendix D).</li> <li><input type="checkbox"/> Ensure any corrective action(s) arising from the inspection and testing is entered into the University's <a href="#">online safety system</a> or an equivalent system (database) that meets the objectives of the <a href="#">Corrective action</a> HSW Handbook chapter. (i.e. a system that enables the recording, assigning and monitoring of actions to completion, within designated time-frames.)</li> </ul>   |
| <p>For a <a href="#">Notifiable incident</a> (see definitions) i.e. Electric shock or Dangerous (electrical) occurrence</p> |  |
| <p><b>8.3 Supervisor/Person in control of the area/activity</b></p> <p>and</p> <p><b>the local HSW team</b></p>             | <p>For incidents relating to an electric shock</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Arrange appropriate transport for the worker to the nearest medical facility/hospital, if they (or a witness) advise that the person:                             <ul style="list-style-type: none"> <li><input type="checkbox"/> received a shock (see <a href="#">definitions</a> for exclusions);</li> <li><input type="checkbox"/> has a noticeable burn to the skin;</li> <li><input type="checkbox"/> had a period of unconsciousness;</li> <li><input type="checkbox"/> has numbness/tingling/paralysis, vision/hearing/speech problems.</li> </ul> </li> </ul> <p>For all notifiable incidents regardless of whether the worker was injured:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Commence the notifiable incident investigation as a priority                             <ul style="list-style-type: none"> <li><input type="checkbox"/> Contact and take advice from the <a href="#">HSW Senior Advisor</a> as soon as possible.</li> <li><input type="checkbox"/> If safe: Attend on site to ensure the area is safe and commence the investigation in accordance with the <a href="#">Incident Investigation</a> HSW Handbook chapter.</li> <li><input type="checkbox"/> Notify and brief the relevant Executive, Head of School/Branch.</li> <li><input type="checkbox"/> Follow the direction of the central HSW Team and SafeWork SA (if applicable).</li> </ul> </li> </ul> |
| <p><b>8.4 Director, HSW (or delegate)</b></p>   | <p><b>For a Notifiable incident i.e. Electric shock or Dangerous (electrical) Occurrence (e.g. a fire)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure a report is provided to SafeWork SA immediately if the the incident meets the definition under the <a href="#">WHS Act</a> Section 35.</li> <li><input type="checkbox"/> Ensure a report is provided to the <a href="#">Office of the Technical Regulator</a> if the incident related to an electric shock, in consultation with a licensed Electrical contractor involved in the investigation:                             <ul style="list-style-type: none"> <li><input type="checkbox"/> in the case of a death resulting from the accident – immediately by phone;</li> <li><input type="checkbox"/> in the case of a person requiring medical assistance – within 1 working day of the accident;</li> <li><input type="checkbox"/> in any other case – within 10 working days of the accident. (Refer to the <a href="#">Electricity Act 1996</a> (SA) for further information.)</li> </ul> </li> </ul>  |

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9 Process: Record keeping

| Person Responsible   | Actions   |
|--|---|
| <p>9.1 Supervisor/Person in control of the area/activity</p> | <p><input type="checkbox"/> Ensure that all documentation summarised in <a href="#">Faculty/Division/School/Branch/Area Records</a>, (Appendix E) is maintained in an auditable format and can be retrieved on request.</p> |

10 Performance Measures

The HSW Team will use performance measures to assist in identifying areas of success and/or where corrective action is required to meet the objectives and targets of this process.

The level of compliance with the chapter and effectiveness will be determined during the internal audit process.

11 Useful information and resources

|      |  |
|------|--|
| 11.1 | <p><b>University related documents and resources</b></p> <ul style="list-style-type: none"> <li>• HSW Handbook Chapter <a href="#">Contractor Management</a></li> <li>• HSW Handbook Chapter <a href="#">Hazard Management</a></li> <li>• HSW Handbook Chapter <a href="#">Provision of HSW information, instruction and Training</a></li> <li>• HSW Handbook Chapter <a href="#">Report a safety issue or incident and Incident investigation</a></li> <li>• HSW Handbook Chapter <a href="#">Training Plan</a></li> <li>• <a href="#">Personal Protective Equipment Information Sheet</a></li> <li>• <a href="#">Plant/equipment Acquisition, Installation and Commissioning Checklist Information Sheet</a></li> </ul>  |
| 11.2 | <p><b>Related Legislation</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Work, Health and Safety Act 2012 (SA)</a></li> <li>• <a href="#">Work, Health and Safety Regulations 2012 (SA)</a></li> <li>• <a href="#">Electricity Act 1996 (SA)</a></li> <li>• <a href="#">Electricity (General) Regulations 2012 (SA)</a></li> <li>• <a href="#">Code of Practice – Managing electrical risks in the workplace (SA)</a></li> <li>• <a href="#">Plumbers, Gas Fitters and Electricians Act 1995</a></li> </ul> <p><b>Australia and New Zealand Standards</b></p> <ul style="list-style-type: none"> <li>• <a href="#">AS 1873 (series) Power-actuated (PA) hand-held fastening tools</a></li> <li>• <a href="#">AS 2359 (series) Powered industrial trucks</a></li> <li>• <a href="#">AS/NZS 3000 (2007) Electrical installations – (known as the Australian/New Zealand Wiring Rules)</a></li> <li>• <a href="#">AS/NZS 3003 (2011) Electrical Installations – patient treatment areas of hospital and medical and dental practices and dialysing locations</a></li> <li>• <a href="#">AS/NZS 3012 (2010) Electrical installations – Construction and demolition sites</a></li> <li>• <a href="#">AS/NZS 3019 (2007) Electrical installations – Periodic verification</a></li> <li>• <a href="#">AS/NZS 3551 (2012) Technical management programs for medical devices</a></li> <li>• <a href="#">AS/NZS 3760 (2010) In-service safety inspection and testing of electrical equipment</a></li> <li>• <a href="#">AS 3947 (series) Low-voltage switchgear and control gear</a></li> <li>• <a href="#">AS 4024 (series) Safety of Machinery</a></li> <li>• <a href="#">AS/NZS 5033 (2014) Installation and safety requirements for photovoltaic (PV) arrays</a></li> <li>• <a href="#">AS/NZS 5761 In-service safety inspection and testing – second hand electrical equipment prior to sale</a></li> <li>• <a href="#">AS/NZS 5762 In-service safety inspection and testing – repaired electrical equipment</a></li> <li>• <a href="#">AS 61010.1 (2003) Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – General requirements</a></li> <li>• <a href="#">AS 60745 (series) Hand-held motor operated electric tools</a></li> </ul> |
| 11.3 | <p><b>Other Resources:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Electric vehicle standards in Australia (Workplan) 2010</a></li> </ul>   |

12 Definitions

**AC** (Alternating Current) is an electric current which periodically reverses direction and changes its magnitude continuously with time in contrast to direct current (DC) which flows only in one direction. Alternating current is the form in which electric power is delivered to businesses and residences, and it is the form of electrical energy that consumers typically use when they plug kitchen appliances, televisions, fans and electric lamps into a power outlet. The abbreviations AC and DC are often used to mean simply alternating and direct, as when they modify current or voltage.

A **competent person, for electrical work on energised electrical equipment or energised electrical installations** (other than testing referred to in WHS Regulations 150 “Inspection and testing of electrical equipment” and 165 “Testing of residual current devices”), a licensed or registered electrician or any other person permitted to carry out electrical worker under relevant Commonwealth, state or territory legislation (for example, electrical engineer, electrical apprentice). For any other case, a person who has acquired through training, qualification or experience, the knowledge and skills to carry out the task.

[Reference Code of Practice “Managing electrical risks in the workplace” 2020 (SA)]

A **competent person, for the purposes of carrying out inspection and testing of electrical equipment**, described in WHS Regulation 150, is a competent person who is licenced or registered to perform electrical work under a law relating to electrical safety or occupational licencing. The person should also be competent to interpret the test results of any equipment they use.

Depending on Commonwealth, state or territory electrical safety laws, a person carrying out testing under AS/NZS 3760:2020 “In-service safety inspection and testing of electrical equipment” could be required to be:

- A licensed or registered electrician (whichever applies); or
- In some jurisdictions, a licensed electrical inspector; or
- A person who has successfully completed a structured training course and been deemed competent in the use of a pass-fail type portable appliance tester and the visual inspection of electrical equipment.

**Cord set** – An assembly of a plug intended for connection to a mains socket-outlet, a sheathed flexible cord and an appliance connector.

**Cord extension set** – An assembly of a plug intended for connection to a mains socket/outlet, a sheathed flexible cord and a cord extension socket.

**Crushing and crimping** means when physical damage is likely to occur to the cord e.g. when the cord is stuck in a door, exposed to traffic e.g. car or in a walkway; cut etc.

**Danger tag** means a tag that indicates plant/equipment isolated from its power source and which cannot be operated. This is to allow maintenance or repair work on the plant/equipment to be performed safely (refer to [Isolation, locking off and access \(Including tagging\)](#) - for the University-approved tag).

**DC** (Direct Current) is the one directional or unidirectional flow of electric charge. An electrochemical cell (battery) is a prime example of DC power. The electric current flows in a constant direction, distinguishing it from alternating current (AC).

**Decommission** means to remove from service.

**De-energised** means separated from all sources of supply but not necessarily isolated, earther, discharged or out of commission.

**Electrical equipment** means any apparatus, appliance, cable, conductor, fitting, insulator, material, meter or wire that

- a) is used for controlling, generating, supplying, transforming or transmitting electricity at a voltage greater than extra-low voltage; or
- b) is operated by electricity at a voltage greater than extra-low voltage; or
- c) is part of an electrical installation located in an area in which the atmosphere presents a risk to health and safety from fire or explosion; or
- d) is, or is part of, an active impressed current cathodic protection system within the meaning of [AS 2832.1 2004 Cathodic protection of metals – pipes and cables](#).

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**12 Definitions (Continued)**

*Electrical equipment does not include any apparatus, appliance, cable, conductor, fitting, insulator, material, meter or wire that is part of a motor vehicle (see note below) if –*

- a) *the equipment is part of a unit of the vehicle that provides propulsion for the vehicle; or*
- b) *the electricity source for the equipment is a unit of the vehicle that provides propulsion for the vehicle.*

*Note: Motor vehicle means a vehicle that is built to be propelled by a motor that forms part of the vehicle.*

**Electrical installation** means a group of electrical equipment that –

- a) are permanently electrically connected together (see note below); and
- b) can be supplied with electricity from the works of an electricity supply authority or from a generating source.

An item of electrical equipment may be part of more than 1 electrical installation.

*Note:*

- *An item of electrical equipment connected to electricity by a plug and socket outlet is not permanently electrically connected; and*
- *Connection achieved through using works of an electricity supply authority is not a consideration in determining whether or not electrical equipment is electrically connected.*

**Electrical risk** means risk to a person of death/shock/or other injury caused directly/indirectly by electricity.

**Electrical work** (in accordance with WHS Regulations 2012) means

- a) connecting electricity supply wiring to electrical equipment or disconnecting electricity supply wiring from electrical equipment; or
- b) installing, removing, adding, testing, replacing, repairing, altering or maintaining electrical equipment or an electrical installation.

*Electrical work does not include the following:*

- *work that involves connecting electrical equipment to an electricity supply by means of a flexible cord plug and socket outlet;*
- *work on a non-electrical component of electrical equipment, if the person carrying out the work is not exposed to an electrical risk (e.g. painting electrical equipment covers and repairing hydraulic components of an electrical motor);*
- *replacing electrical equipment or a component of electrical equipment if that task can be safely performed by a person who does not have expertise in carrying out electrical work (e.g. replacing a fuse or a light bulb);*
- *assembling, making, modifying or repairing electrical equipment as part of a manufacturing process;*
- *building or repairing ducts, conduits or troughs, where electrical wiring is or will be installed if –*
  - *the ducts, conduits or troughs are not intended to be earthed, and*
  - *the wiring is not energised; and*
  - *the work is supervised by a registered electrical worker;*
- *locating or mounting electrical equipment, or fixing electrical equipment in place, if this task is not performed in relation to the connection of electrical equipment to an electricity supply;*
- *assisting a registered electrical worker to carry out electrical work if:*
  - *the assistant is directly supervised by the registered electrical worker; and*
  - *the assistance does not involve physical contact with any energised electrical equipment;*
- *carrying out electrical work, other than work on energised electrical equipment, in order to meet eligibility requirements in relation to becoming a registered electrical worker.*

**Electrical worker** means a person authorised by registration under Part 3 of the [Plumbers, Gas Fitters and Electricians Act 1995](#) (SA) to act as an electrical worker.

**Electric portable outlet device (EPOD)** – a device, other than a cord set or cord extension set having a single means of connection to a low voltage supply, and one or more outlet facilities. It may incorporate a reeling or coiling arrangement.

**Energised (live)** means connected to a source of electrical supply or subject to hazardous induced or capacitive voltages.

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12 Definitions (Continued)

**Extra low voltage** means voltage that does not exceed 50 volts alternating current (50V AC) or 120 volts ripple-free direct current (120V ripple-free DC).

**Fixed equipment** – Equipment which is fastened to a support, secured in position or otherwise, due to its size and mass, located in a specific location. (Note – Adhesives are not recognised as a means of fastening fixed equipment to a support under AS/NZS 3760 unless specifically allowed in another Standard.)

**Heritage Plant/equipment** means machinery, equipment, appliances, implements or tools which form part of Australia’s industrial heritage. To be considered heritage the plant/equipment must be at least 30 years old and not in productive service.

**Hostile environment** – one in which the equipment or appliance is normally subject to events or operating conditions likely to result in damage to the equipment or a reduction in its expected life span. This includes, but is not limited to mechanical damage, exposure to moisture, heat, vibration, corrosive chemicals and dust.

**Isolation and energy dissipation** means a procedure which consists of all of the four following actions:

- Isolating (disconnecting, separating) the machine (or defined parts of the machine) from all power supplies.
- Where necessary (for instance in large machines or in installations), locking (or otherwise securing) all the isolation units in the isolating position;
- Dissipating or restraining (containing) any stored energy which may give rise to a hazard.  
**Note:** energy may be stored in:
  - a) Mechanical parts continuing to move through inertia;
  - b) Mechanical parts liable to move due to gravity;
  - c) Capacitors and accumulators;
  - d) Pressurised fluids; or
  - e) Springs.
- Verifying by means of a Safe Operating Procedure that the actions taken according to the three dot points above have produced the desired effect.

**Kinking, coiling and wrapping** means the action that a person uses when packing up a cord for a laptop computer or a portable projector; it is folding or coiling action and does not normally result in internal damage to the cord.

**Notifiable electrical incident (Dangerous incidents including “near misses”)** [Extract SafeWork SA factsheet](#)

- Electric shock:  
 Examples of electrical shocks that are notifiable
  - minor shock resulting from direct contact with exposed live electrical parts (other than ‘extra low voltage’) including shock from capacitive discharge
 Examples of electrical shock that are not notifiable
  - shock due to static electricity
  - ‘extra low voltage’ shock (i.e. arising from electrical equipment less than or equal to 50V AC and less than or equal to 120V DC)
  - defibrillators are used deliberately to shock a person for first aid or medical reasons
- any incident in relation to a workplace that exposes any person to a serious risk resulting from an immediate or imminent exposure to electric shock or a prescribed fire under the [Electricity Act](#) (i.e. the attendance of the Emergency Services).

**Out of service tag** means a tag that indicates plant/equipment that either has a fault, or is unsafe to operate and is being removed from service (refer to [Isolation, locking off and access \(Including tagging\)](#) - Appendix D for the University-approved tag).

**Plant/equipment** means:

- any machinery, equipment, appliance, implement or tool; and
  - any component of any of those things;
  - anything fitted or connected to any of those things.
- (It includes items such as lifts, cranes, computers, machinery, conveyors, forklifts, vehicles, power tools, quad bikes, mobile plant and amusement devices.)

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## 12 Definitions (Continued)

A **proficient person** means one who has been trained and assessed in a task, and has been deemed able to carry out those duties without supervision.

**Residual current device** (RCD) means a mechanical switching device designed to make, carry and break currents under normal service conditions, and to cause the opening of contacts when the residual current attains a given value under specified conditions as defined in [AS/NZS 3760 \(2010\) In-service safety inspection and testing of electrical equipment](#).

**Residual Risk** means the risk remaining after implementation of risk controls.

**Stationary equipment** means equipment having a mass exceeding 18 kg

**Voltage (V)** – differences of electric potential, normally existing between conductors and between conductors and earth as follows:

- (a) Extra-low voltage (ELV) – not exceeding 50 V AC or 120 V ripple free DC;
- (b) Low voltage (LV) – exceeding extra-low voltage, but not exceeding 1000 V AC or 1500 V DC.

**Worker** means according to the [WHS Act 2012 \(SA\)](#) a person where the person carries out work in any capacity for a person conducting a business or undertaking, including work as -

- (a) an employee; or
- (b) a contractor or subcontractor; or
- (c) an employee of a contractor or subcontractor; or
- (d) an employee of a labour hire company who has been assigned to work in the person's business or undertaking; or
- (e) an outworker; or
- (f) an apprentice or trainee; or
- (g) a student gaining work experience; or
- (h) a volunteer; or
- (i) a person of a prescribed class.

The person conducting the business or undertaking is also a worker if the person is an individual who carries out work in that business or undertaking. **Note:** Higher Degree Research and Honours students and Academic Visitors are likely to be workers under the [WHS Act 2012 \(SA\)](#).

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## EXAMPLES OF SPECIFIC ELECTRICAL HAZARDS AND CONTROL MEASURES (Hierarchy of Controls)

**Examples of electrical hazards**

- Obvious damage, defects or modifications to the electrical equipment, including accessories, connectors, plugs or cord extension sockets
- Discolouration that may indicate exposure to excessive heat, chemicals or moisture
- Electrical cords are inappropriately positioned e.g. not effectively anchored, could pose a trip hazard or are inappropriately located in a walkway/thoroughfare
- Exposed energised parts:
  - bare conductors
  - internal parts of electrical equipment
  - external parts of electrical equipment that have become energised because of an internal fault
  - metallic or other conductive equipment that has inadvertently become live
- Operating conditions that could damage equipment e.g. outdoors, atmosphere, hostile environment, exposure to moisture, heat, vibration, mechanical damage, corrosive chemicals or dust
- Portable, plug in equipment including extension leads that are frequently moved
- Faulty equipment or installations (e.g. faulty light switch)
- Operating controls are not in good working order i.e. damaged or not appropriately identified
- Covers, guards etc are not secured and working in the manner intended by the manufacturer or supplier intended e.g. ventilation inlets and exhausts are obstructed
- Electrical fault – fire, burning, arcing (release of various gases and contaminants) or explosion
- Exposure to high electromagnetic fields (this may present a potential hazard for workers with some medical conditions e.g. pacemakers.)
- Inappropriate work practices/procedures e.g. failing to isolate equipment to carry out cleaning or maintenance
- Working with electrical equipment when on a ladder, tower, in a confined space or an atmosphere that presents a risk
- Working on energised electrical equipment (see WHS Regulations sections 152 – 162 for specific requirements.)
- Electrical drawings/tables not reflecting “as installed” installations
- Installing, operating, and maintaining solar power or photovoltaic (PV) systems is often high risk. Even if disconnected from the mains electrical supply or shutdown at the switchboard, PV systems can be energised by sunlight or stored energy in batteries.

**Examples of risk control measures**

In most cases, risk is controlled by a combination of several levels. Where the risk cannot be eliminated then consider Level 2 then level 3 and level 4 controls. Some options for consideration are as follows:

| Hierarchy of control |                                     | Examples of control measures  |
|----------------------|-------------------------------------|---|
| Level 1              | Elimination                         | <ul style="list-style-type: none"> <li>• Ensuring equipment is de-energised.</li> <li>• Decommissioning/disposal of unsafe equipment.</li> </ul>  |
| Level 2              | Substitution                        | <ul style="list-style-type: none"> <li>• Replacing a hazardous process or item of equipment (e.g. using extra-low voltage electrical equipment such as a battery-operated tool rather than a tool that is plugged into mains electricity).</li> </ul>   |
|                      | Engineering/ Isolation              | <ul style="list-style-type: none"> <li>• Preventing workers from coming into contact with the source of an electrical hazard.</li> <li>• Use of insulation and guarding.</li> <li>• Protecting power circuits by the appropriate rated fuse or circuit breaker to prevent overloading</li> <li>• Ensuring circuits, where portable electrical equipment can be connected, are protected by appropriately rated RCDs (as required by the WHS Regulations). Refer to <a href="#">Appendix C</a> for further information.</li> <li>• Establishing exclusion zones</li> </ul>   |
| Level 3              | Administrative                      | <ul style="list-style-type: none"> <li>• Provision of information, instruction, training and supervision.</li> <li>• Obtaining licences and permits.</li> <li>• Scheduling testing, tagging and maintenance of equipment and RCDs (Note the nature and frequency of inspection/testing will vary depending on the electrical risks.)</li> <li>• Use of isolation, lock off and Danger/Out of Service tags (refer to <a href="#">Isolation, locking off and access (Including tagging)</a> - Appendix D).</li> <li>• Arranging electrical leads so they will not be damaged, run across floors/doorways/sharp edges.</li> <li>• Documenting Safe Operating Procedures (SOPs) where required by the risk assessment (The SOP could also specify when not to use leads and tools if this is foreseeable e.g. in damp or wet conditions unless they are specially designed for those conditions where applicable)</li> <li>• Use of warning signs</li> <li>• Emergency plans in the event of an electrical incident e.g. in a higher risk workplace, confined space, working at height, use of an elevating work platform, a workplace with a hazardous atmosphere).</li> </ul> |
| Level 4              | Personal Protective Equipment (PPE) | <ul style="list-style-type: none"> <li>• Providing operators with appropriate safety equipment e.g. eyewear, insulated gloves, hard hats. (Refer to the <a href="#">Code of Practice “Managing electrical risks in the workplace” section 8.5</a> for the PPE requirements for electrical work.)</li> </ul>   |

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## ELECTRICAL INSPECTION AND TESTING: DECISION TOOL

### ELECTRICAL TESTING IS NOT REQUIRED

**If you answer yes to any of the following – under AS/NZS 3760:2010**

Is the equipment new?

*(Note – the supplier is deemed responsible for initial electrical safety. New equipment does not need to be tested but still examined for obvious damage. Where there is no obvious damage as deemed by the owner or Head of School/Branch it is to be tagged in accordance with AS/NZS 3760 section 2.4.2.1)*

Is it electrical equipment (such as suspended light fittings) installed at a height of 2.5m or greater above the ground, floor or platform, where there is no reasonable chance of a person touching the equipment?

Is it equipment which would need to be dismantled to perform the inspection and tests?

Is it **fixed** (except RCDs) or **stationary equipment** connected to wiring that forms part of an **electrical installation** (e.g. a permanent/fixed installation that does not have a plug/socket outlet)?

### ELECTRICAL TESTING IS REQUIRED

**(at the frequencies outlined in Appendix B, page 2)**

**If you answer yes to any of the following – under AS/NZS 3760:2010**

Is the equipment portable, hand-held or **stationary equipment**, designed for connection into a socket-outlet?

Is it **fixed** or **stationary equipment** connected by flexible cable/cord that is exposed to damage or in a **hostile environment**?

Is the equipment **fixed** or **stationary** with a flexible cable/cord and moved for restocking, maintenance or, cleaning?

Is it a cord set, extension cord or outlet device or power board?

Is it a portable power supply (including a power adaptor/plug pack)?

Is it a portable inverter that generates or produces low voltage?  
i.e. exceeding 50 V AC or 120 V ripple free DC but not exceeding 1000 V AC or 1500 V DC. (See [AS/NZS 3010](#) or [AS 2790](#) for additional information for other portable generators)

Is it a battery charger?

Is the equipment portable and heavy duty tool such as high pressure washers or concrete grinder?

Is it a Residual Current Device (RCD)?

Is it medical equipment or any equipment connected to the medical equipment?  
(Note – in additional electrical testing, performance verification is also required. For testing procedures refer to [AS/NZS 3551](#) “Management programs for medical equipment” or [AS/NZS 3003](#) “Electrical Installations – patient areas”)

Is it hire equipment?

Has the equipment been repaired, serviced? ([AS/NZS 5762](#) “In-service safety inspection and testing – repaired electrical equipment” may apply)

Is the equipment second-hand? ([AS/NZS 5761](#) “In-service safety inspection and testing – second hand electrical equipment prior to sale” shall apply)

### Definitions and references

#### Fixed equipment

Equipment which is fastened to a support, secured in position, located in a specific location due to its size and mass.

#### Stationary equipment

Equipment having a mass exceeding 18kg

#### Flexing

Flexing in this circumstance means crushing/crimping not kinking/coiling/wrapping

#### Electrical installation

A permanent/fixed installation that does not have a plug/socket outlet

#### Hostile environment

Operating conditions likely to result in damage to the equipment or a reduction in its expected life span. This includes, but is not limited to mechanical damage, exposure to moisture, heat, vibration, corrosive chemicals and dust.

#### Inspecting and testing electrical equipment – other than equipment used in specified higher risk operating environments

(Code of Practice “Managing electrical risks in the workplace” section 3.2)

Lower-risk workplaces include those workplaces that are dry, clean, well-organised and free of conditions that are likely to result in damage to electrical equipment, for example an office, classroom etc. Electrical equipment commonly used in these types of workplaces includes computers, printers and stationary or fixed electrical equipment. Electrical equipment used in lower-risk workplaces may still need inspection and testing on a less frequent basis to ensure that it is safe for continued use.

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## ELECTRICAL INSPECTION AND TESTING: INTERVALS

### Indicative testing and inspection intervals for electrical equipment

In accordance with Table 4 [AS/NZS 3760 \(2010\) In-service safety inspection and testing of electrical equipment](#)  
(Caution: This page must be read in conjunction with AS/NZS 3760 as a whole and particularly section 2.1)

#### Frequency of inspection and testing

The intervals for testing in [AS/NZS 3760 \(2010\)](#) are summarised in the table below. Testing is subject to a tolerance of two weeks. Inspecting and testing of electrical equipment must be carried out by a [competent person](#).

#### Variations to the frequency for testing

The frequency for testing can only be varied by the Head of School/Branch based on a risk assessment. If substituting other periods other than those indicated below the documented risk assessment must be completed in accordance with the process specified in [AS/NZS ISO 31000](#) "Risk management guidelines" and take into consideration any relevant legislative requirements or guidelines. The risk assessment option does not apply to equipment offered for hire.

| Type of environment and/or equipment   | Interval between inspection and tests  |   |           |                                     |           |
|--|--|---|-----------|-------------------------------------|-----------|
|  | Equipment including Class 1 equipment, Class II equipment, cord sets, cord extension sets and EPDs (See definitions) | Residual current devices (RCDs)                     |           |                                     |           |
|  |  | Push-button test – by user                          |           | Operating time and push-button test |           |
| (a)  | (b)  | Portable (c)  | Fixed (d) | Portable (e)                        | Fixed (f) |
| 1) Factories, workshops, places of manufacture, assembly, maintenance or fabrication   | 6 months   | Daily, or before every use, whichever is the longer | 6 months  | 12 months                           | 12 months |
| 2) Environment where the equipment or supply flexible cord is subject to flexing in normal use or is open to abuse or is in a <a href="#">hostile environment</a>      | 12 months  | 3 months  | 6 months  | 12 months                           | 12 months |
| 3) Environment where the equipment or supply cord is not subject to flexing in normal use and is not open to abuse and is not in a <a href="#">hostile environment</a> | 5 years  | 3 months  | 6 months  | 2 years                             | 2 years   |
| 4) Residential type areas of boarding houses, halls, hostels accommodation houses and the like   | 2 years  | 6 months  | 6 months  | 2 years                             | 2 years   |
| 5) Hire equipment Inspection   | Prior to hire  | Including push-button test by hirer prior to hire   |           | N/A                                 | N/A       |
| 6) Hire equipment Electrical testing   | 3 months   | N/A   |           | 3 months                            | 12 months |
| 7) Repaired, serviced and second-hand equipment  | After repair or service which could affect electrical safety, or on reintroduction to service. Refer to AS/NZS 5762. |   |           |                                     |           |

*Note: Regulatory authorities, other Standards, workplace safety requirements or manufacturers' instructions may specify shorter or longer intervals appropriate to particular industries or specific types of equipment. Some regulatory jurisdictions limit the inspection and testing of electrical equipment to defined work activity or working environments. For example construction work or equipment used in a hostile operating environment.*

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## REQUIREMENTS FOR RESIDUAL CURRENT DEVICES (RCD)

### General

There is a requirement to minimise the electrical risks associated with the supply of electricity to ‘plug in’ electrical equipment by the use of an appropriate RCD in certain higher-risk workplaces.

([WHS Regulations](#) Section 164 and Code of Practice [Managing electrical risks in the workplace 2020 \(SA\)](#).)

Subject to the exceptions outlined below, the requirement to use an appropriate RCD applies when electrical equipment is:

- used in an environment in which the normal use of electrical equipment exposes the equipment to operating conditions that are likely to result in damage to the equipment, or a reduction in its expected life span, including conditions that involve exposure to moisture, heat, vibration, mechanical damage, corrosive chemicals or dust
- moved between different locations in circumstances where damage to the equipment or to a flexible electricity supply cord is reasonably likely;
- frequently moved during its normal use;
- forms part of, or is used in connection with, an amusement device.

This does not apply if the supply of electricity to the electrical equipment:

- does not exceed 50 Volts alternating current (AC); or
- is direct current (DC); or
- is provided through an isolating transformer that provides at least an equivalent level of protection; or
- is provided from a non-earthed socket outlet supplied by an isolated winding portable generator that provides at least an equivalent level of protection.

### Types of RCD

There are two main types available:

- Non-portable RCDs  
Non-portable (or fixed) RCDs are installed at either the switchboard or a fixed socket outlet. Non-portable RCDs installed at the main switchboard will protect all the wiring and electrical equipment plugged into the relevant circuit(s).
- Portable RCDs  
Protect the electrical equipment that is plugged into them. Portable plug-type RCDs can be plugged into a socket outlet to protect a single piece of equipment. They can be incorporated into a power cable or can be the RCD unit alone, without a cord. Portable stand-alone units are incorporated into a power board. They provide multiple protected socket outlets and can provide RCD protection to multiple items of electrical equipment from one power board.

The WHS Regulations do not prescribe whether RCDs must be non-portable or portable. The most appropriate RCD will depend on the workplace environment and should be included on the Risk Assessment as a control measure.

For additional guidance refer to the Code of Practice “Managing electrical risks in the workplace” Appendix B “Advantages and disadvantages of non-portable and portable RCDs).

### Electrical equipment that requires RCD protection

If the supply of electricity in any situation in a workplace is through a socket outlet not exceeding 20 amps to:

- all hand-held electrical equipment (e.g. drills, saws).
- portable electrical equipment that is frequently moved during its normal use.
- electrical equipment that is moved between different locations in circumstances where damage to the electrical equipment or flexible supply cord is reasonably likely (e.g. electric welders, portable bench saws and extension cords).
- the normal use of the electrical equipment exposes the equipment to operating conditions that are likely to result in damage to the equipment or a reduction in its expected life span.

The electrical equipment must be protected by an RCD with a tripping current not greater than 30 milliamps.

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## REQUIREMENTS FOR RESIDUAL CURRENT DEVICES (RCD)

A RCD must be:

- for a new electrical installation – a non-portable RCD; and
- for a new or modified circuit on an existing electrical installation – a non-portable RCD; and
- for an existing electrical installation where where neither of the above apply – either a non-portable RCD or a portable RCD where a portable RCD is connected at the socket outlet supplying electricity to any electrical equipment.

The requirement for an RCD does not apply where:

- the supply of electricity is to an extra low voltage system that is electrically separated from earth and from other systems in such a way that a single fault cannot give risk to the risk of electric shock; or
- the supply of electricity is to electrical plant (see note below) and is –
  - direct current (DC); or
  - provided through an isolating transformer that complies with AS/NZS 61558 Safety of power transformers, power supply units and similar; or
  - provided from a portable generator that complies with AS 2790 Electricity generating sets – Transportable (Up to 25 kW)

(Note: Electrical plant means plant which consumes, converts or generates electricity.)

### Inspection and testing

RCDs used at the workplace, both portable and non-portable, must be tested regularly by a [competent person](#), for the purposes of carrying out inspection and testing of electrical equipment, to ensure the devices are working effectively.

If an RCD is tested and found to be faulty it must be taken out of service and replaced as soon as possible.

For guidance on approval and test specifications, see AS/NZS 3190:2016 “Approval and test specification – Residual current devices”.

### Testing new portable RCDs

A new portable RCD unit should be tested by pressing the “trip test” button to ensure the RCD is effective.

Portable RCDs must be tested before the device is used on any day by means of the built-in test facility. In addition, programmed testing must be conducted and recorded within the School/Branch in accordance with the [Electrical Inspection and Testing: Decision Tool](#) (Appendix B).

**Note:** day to day testing does not need to be recorded.

### Records

Testing records are to be maintained by the School/Branch, to provide evidence that portable RCDs have been tested. Records must be kept in accordance with [Faculty/Division/School/Branch/Area Records](#), (Appendix E).

### Tags

Portable RCDs must be tagged to indicate the date of the next test and should be checked to monitor compliance with the Regulations.

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## ISOLATION, LOCKING OFF AND ACCESS (Including tagging)

To ensure electrical equipment or circuits remain de-energised while working, they are to be isolated from all relevant sources of electricity supply. This may include opening switches, removing fuses or links, opening circuit breakers or removing circuit connections.

Safe isolation procedures, including the use of locks and tags should be developed in consultation with the relevant workers. Where isolation procedures are used, the appropriate level of information, instruction, training and supervision is to be provided by the supervisor/person in control of the area/activity.

### Locking off

Isolation points should be fitted with control mechanisms that prevent the electrical equipment from being inadvertently re-energised. The control mechanism should require a deliberate action to engage or disengage the device. This may include switches with a built-in lock, and lock-outs for switches, circuit breakers, fuses and safety lock-out jaws, clips, screw, bolt or pin that can be inserted to prevent a switch from being operated. They should be used in conjunction with additional control measures such as danger tag and permit systems. In situations where isolation points are accessible by other people the isolation method or system used should not be able to be inadvertently or easily compromised.

### Tagging systems

Danger (Lockout) and Out of Service tags must be used to clearly identify that either operators, maintenance staff, contractors and/or sub-contractors are engaged in the cleaning, repair or maintenance of the plant/equipment, or when an item of plant/equipment has been assessed as unsafe and has been isolated from service.

#### Out of Service tag

- Out of Service tags are used to identify electrical equipment that is not safe to use or fit for purpose.
- Anyone can place an Out of Service tag on equipment if they consider it to be unsafe or unserviceable and must then immediately inform their supervisor/person in control of the activity/area.
- The Out of Service Tag must be completed in **ink** (or permanent marker); and must be signed, dated and indicate why the plant/equipment has been taken out of service.
- Tags are to be attached in a suitable location to prevent the operation of faulty or unsafe plant/equipment.
- Plant/equipment must be disconnected from energy sources. Keys or other starting devices must be removed and locked away to ensure that the plant/equipment cannot be operated.
- Only a **competent person**, for the purposes of carrying out inspection and testing of electrical equipment, can remove the tag after fixing or rectifying the defect and making the electrical equipment safe.
- An Out of Service tag indicates that plant/equipment is unsafe to operate. It does not indicate that the plant/equipment is safe to work on for cleaning, maintenance or repair.



#### Danger (lockout) tag and locks

- A danger tag should be attached to normal locks at all points of isolation used to de-energise electrical equipment from its electricity supply.
- A tag does not by itself, perform the isolation function.
- Danger tags are not required when using dedicated personal isolation locks.
- Danger tags are used for the duration of the electrical work to warn others that:
  - the electrical equipment is isolated or out of service
  - the electricity supply must not be switched back on or reconnected
  - reconnection electricity may endanger the life of the electrical workers(s) working on the equipment.

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APPENDIX D (Page 2 of 3)

**ISOLATION, LOCKING OFF AND ACCESS (Including tagging)**

**Danger (lockout) tag and locks (continued)**

- The danger tag should:
  - be durable and securely fixed to the isolator
  - clearly state the warning, including any warning about specific hazards relating to the isolation (for example, multiple points of supply)
  - be dated and signed by the worker or workers involved in carrying out the work or where appropriate, by the supervisor in charge of the workers.
  - be attached in a prominent position on each isolation point
  - only be removed by the signatories to the tag. If unavailable and unable to return, measures must be put in place to manage risk associated with removing the lock or tag (for example, thorough investigation to ensure all workers and others at the workplace are safe.)



If the work is incomplete, the last person removes their danger tag or lock and replaces it with a warning tag for example, out-of-service or caution tag.

When work is resumed, the person in charge of the work removes the warning (out-of-service or caution) tag and each person then applies their danger tag and/or lock.

When work is completed, each person removes their danger tag and/or lock.

Where a formal permit system is used, all reasonable steps should be taken to ensure that the designated sign-on and tagging procedures are followed.

**Removing another person’s Danger tag**

Under normal conditions, no person will remove or destroy another person’s Danger tag or locking device. However, at times a piece of plant/equipment is required to be returned to operation and the isolation point contains one or more tags belonging to people absent from the workplace.

The person requiring the plant/equipment will advise their work supervisor/person in control of the area/activity of the situation.

- The supervisor/person in control of the area/activity will contact the individual indicated on the tag and have them come back on site to remove the tag/lock.
- If this is not possible, or if the person cannot be contacted, the supervisor/person in control of the area/activity will nominate a suitable **competent person, for electrical work on energised electrical equipment or energised electrical installations** (in relation to task) to investigate the situation. This investigation must ensure that no person or plant/equipment will be endangered or damaged by the removal of the tag/lock by other than the signatory.
- The supervisor/person in control of the area/activity along with the nominated competent person shall co-sign the Danger tag(s), remove the locks and tags and submit them, detailing the event, to the Head of School/Branch within 24 hours of the incident occurring. The incident must then be recorded as per HSW Handbook Chapter [Report a safety issue or Incident](#)

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## ISOLATION, LOCKING OFF AND ACCESS (Including tagging)

**Placement of safety locks**

Safety locks provide an additional level of protection when installing, repairing or maintaining plant/equipment. Safety locks conjoined to a Danger tag will be installed to secure the means of isolation. Locks will be affixed through the appropriate isolation point with the keys removed to prevent accidental removal. All keys to the lock will stay with the person responsible for applying the isolation.

In some instances the plant/equipment isolation mechanism may not be physically large enough to restrain the large numbers of required isolation devices. In cases such as this a multiple lock device (lock-out scissors) can be used to restrain the numerous devices for workers until the completion of the task.



**Removing tags/locks**

- Inform others concerned that the plant/equipment will return to service and confirm that all guards have been reinstated.
- Remove only the tag/lock with your own signature and destroy the tag.
- Never remove or destroy another person’s Danger tag or locking device (see below for exception).
- Any person finding a loose completed Out of Service tag shall assume that it has been unintentionally detached from the isolation device and immediately notify the work supervisor/manager. The supervisor/person in control of the area/activity will then ascertain which item of plant/equipment the tag belongs to and make the situation safe.

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## FACULTY/DIVISION/SCHOOL/BRANCH/AREA RECORDS

### Records to be kept by the Faculty/Division/School/Branch/Area

(Note that records are to be kept in a format or in a known location (to all applicable workers) which can be easily retrievable if required to be viewed by the University or a Regulatory organisations e.g. SafeWork SA).

| Document(s)  | Required information  | Comments   |
|--|---|--|
| Risk Assessments and SOPs (where required) in accordance with the <a href="#">Hazard Management</a> Handbook chapter | Identification of reasonably foreseeable hazards; and<br>Control measures to eliminate or minimise the risks.   | To be retained in accordance with the State Records of SA, General disposal <a href="#">Schedule No 30</a> issued under the State Records Act 1997 (Section 13.25.3).<br>(Contact the University's Records Management Office for further assistance/information if required).  |
| Electrical inspection and testing records  | Supplied by the electrical tester.<br><br>A record of testing must specify the following:<br><input type="checkbox"/> The name of the person who carried out the testing<br><input type="checkbox"/> The date of the testing<br><input type="checkbox"/> The outcomes of the testing; and<br><input type="checkbox"/> The date on which the next testing must be carried out.<br><br>The record may be in the form of a tag attached to the electrical equipment, a log book, database, register. | To be retained for 10 years in accordance with the State Records of SA, General disposal <a href="#">Schedule No 30</a> issued under the State Records Act 1997 (Section 14.4.2).<br>(Contact the <a href="#">University's Record Services</a> for further assistance/information if required).<br><br>If a tag is not used you should ensure that the tested electrical equipment is marked or labelled so that records of testing can clearly identify the relevant equipment. |
| RCD testing and inspection records   | A record of testing (other than daily testing) must be kept.<br><br>This requirement covers RCDs used in all operating environments including non-portable (or fixed) RCDs.   | To be retained for 10 years in accordance with the State Records of SA, General disposal <a href="#">Schedule No 30</a> issued under the State Records Act 1997 (Section 14.4.2).<br>(Contact the <a href="#">University's Record Services</a> for further assistance/information if required).  |
| New equipment that has never been put into use (other than second-hand equipment)                                    | The date the electrical equipment was placed into service should be recorded e.g. on the record of installation or elsewhere.   | The equipment may also be fitted with a tag stating that the equipment is "new to service" the date of entry into service" the date when the first electrical safety test is due and that the equipment has not been tested.   |

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**FACULTY/DIVISION/SCHOOL/BRANCH/AREA RECORDS**

**Records to be kept by the Faculty/Division/School/Branch/Area (Continued)**

| Document(s)   | Required information   | Comments   |
|---|--|--|
| Processes for testing, maintenance, inspection and calibration reports (where these activities are conducted in-house). | <ul style="list-style-type: none"> <li>Standards against which plant/equipment should be inspected.</li> <li>The frequency of inspections.</li> <li>Critical safety processes to be followed during inspections (e.g. isolation process).</li> <li>The process for different types of inspections (required by manufacturer's instructions).</li> <li>Results of tests or location of where the results are kept.</li> </ul> |  |
| Specific Proficiency record or Qualification/competency record  | Copy of the record where instruction/training (Level 2 and Level 3) is identified by the risk assessment and/or a legislative requirement.   | Refer to the HSW Handbook chapters <a href="#">Training Plan</a> and <a href="#">Provision of Information, instruction and training</a> .  |
| Licences and qualifications   | Copy of licence(e.g. for energised electrical work when permitted)   |  |
| Decommissioning, dismantling and disposal records   | <p>Refer to the <a href="#">Plant/Equipment Safety Management</a> chapter (Appendix H).</p> <p>The Supervisor/Person in control of the activity is to ensure the same procedure to identify any hazards inherent in the process. Where a risk assessment has been conducted the record is to maintained in accordance with the <a href="#">Hazard Management</a> Handbook chapter.</p>                                       | To be retained in accordance with the State Records of SA, General disposal <a href="#">Schedule No 30</a> issued under the State Records Act 1997 (Section 13.25.3). (Contact the <a href="#">University's Record Services</a> for further assistance/information if required). |