Electrical Safety Procedure

Section 1 - Preamble

(1) Charles Darwin University ('the University', 'CDU') is committed to fostering a safe workplace and learning environment in regard to electrical safety. Many national technical and safety standards have been developed to assist the safe control and use of electricity.

Section 2 - Purpose

(2) This procedure outlines the necessary steps for safe management of activities that involve electricity and electrical works.

Section 3 - Scope

(3) This procedure applies to all workers, as defined by the Work Health and Safety (National Uniform Legislation) Act 2011, including higher degree by research candidates and affiliates, who undertake any activities on University premises, or who execute work for or on behalf of the University either on or off campus.

Section 4 - Procedure

Electrical shock

(4) Correctly following all parts of this procedure will ensure safe work practices are followed and should prevent electrical shock incidents from occurring.

(5) If a person receives an electrical shock during training or as part of their normal working duties the DRSABCD process must be followed.

a. If safe, de-energise the power supply (turn it off). Energised (Live) means connected to a source of electrical supply or subject to hazardous induced or capacitive voltages;
    i. Low voltage - if it is not possible to turn off the supply, remove the person from contact by using non-conductive dry materials. For example, heavy duty insulated gloves or wooden poles.
    ii. High voltage - do not attempt to rescue a person until the power has been de-energised.
b. Use caution and check if the ground is wet.
c. Make safe any items of plant that are isolated.
d. When it is safe to do so, apply first aid and continue to assist.

Medical assessment and treatment

(6) Effects of electrical shock are varied. The common signs are exhaustion, dizziness, and weakness.

(7) A person who has suffered any electrical shock must see a medical practitioner for assessment as soon as possible after an incident.

a. An ambulance must be called to take the person to hospital if:
    i. first aid has been applied;
    ii. the injured person complains of symptoms consistent with electrical shock; or
    iii. the person has known history of cardiac issues.
b. A private or University vehicle may be used in other cases. Two employees must travel in the vehicle in addition to the injured person. One employee will drive the vehicle and the second employee will observe the injured person. The employees taking an injured person for medical assessment must take a mobile phone, a first aid kit, and an Automated External Defibrillator (AED), if available.

Reporting

(8) Following an electrical shock incident, Security and Work Health and Safety must be notified.

(9) The Senior Manager Work Health and Safety must notify the relevant state or territory safety regulator immediately after becoming aware that a notifiable incident has occurred and keep records for five (5) years.

a. Verbal notification must be made as soon as possible and within 24 hours, followed up with written notification within 48 hours.
b. The area in which the incident occurred must be preserved in accordance with regulatory requirements, and not disturbed until formal notification is given. However, this will not stop any action from being taken to make the area safe and prevent further injury.

Managing risks of electrical equipment

(10) The University has a duty of care to ensure that employees and visitors on University properties are safe from injury and risks to health. Therefore, any safety risks surrounding electrical hazards must be managed in accordance with the requirements of the Work Health and Safety (National Uniform Legislation) Act 2011 and Work Health and Safety (National Uniform Legislation) Regulations 2011.

(11) A systematic risk management approach must be applied to eliminate or control the risk of electrical hazards. Control measures include:

a. routine visual checks;
b. regular inspection;
c. scheduled maintenance;
d. repair;
e. replacement;
f. use of Residual Current Devices (RCDs), a fixed or portable device intended to isolate supply to protected circuits, socket outlets or electrical equipment in the event of a current flow to earth that exceeds a predetermined value; and
g. where warranted, testing of identified electrical equipment.

Environments requiring testing

(12) Regulations state that environments requiring testing are those which expose equipment to moisture, heat, vibration, mechanical damage, corrosive chemicals or dust. Examples include:

a. wet or dusty areas;
b. outdoors or workplaces that use corrosive substances; or
c. commercial kitchens and manufacturing environments.

(13) More frequent testing and tagging will be scheduled in University training kitchens, laboratories, bakeries, the hairdressing salon, and workshops as these are considered high-risk operating environments. Assessment of other University workplaces should be carried out to determine if they are considered a high-risk operating environment under the Australian Standards and Regulations in collaboration with the Work Health and Safety Team.

Requirements for serviced or repaired electrical equipment

(14) Electrical equipment that has been serviced or repaired must be inspected, tested and tagged before the equipment is placed back into service. Any second-hand electrical equipment purchased must be tested and tagged before its first use.

Who can inspect and test electrical equipment

(15) The inspection and testing of electrical equipment must be done by a competent person.

(16) The competent person must be authorised by the University and the person authorising the work must make sure the inspection and testing program is appropriate and adequate for the needs of the workplace. If in doubt, the person authorising the inspection and testing program must obtain advice from a person qualified in electrical matters, an electrician, electrical contractor or specialist testing provider.

Visual and physical inspection

(17) AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment - In-service Safety Inspection and Testing of Electrical Equipment and RCDs, requires the following equipment checks be made by visual and physical inspection of all equipment:

a. Check for obvious damage, defects, or modifications in the equipment and its accessories, connectors, plugs or cord extension sockets; and for discoloration that may indicate exposure to excessive heat, chemicals or moisture.
b. Check that flexible cords are effectively anchored to equipment, plugs, connectors and cord extension sockets.

(18) Inspection includes flexing and straining at points of entry and clamping points by the application of reasonable combination of push/pull and rotary movements for the detection of broken strands or loose connections.

a. Check for damage to flexible cords to ensure that:
    i. The inner cores of flexible cords are not exposed or twisted.
    ii. The external sheaths are not cut, abraded, twisted, or damaged to such an extent that the insulation of the inner cores is visible.
    iii. Unprotected conductors or the use of banding insulation tape are not in evidence.

(19) Careful running of the flexible cord through the hand will often detect internal damage such as twisted conductors or broken core filling. Connecting the plugs/cord extension sockets of cord extension sets together helps to confirm that the terminals have not spread.

(20) For Electrical Portable Outlet Devices (EPODs):

a. Check the warning indicating the maximum load to be connected to the device is intact and legible and the Ingress Protection (IP) rating outlined in Appendix 1. IP rating, classifies and rates the degree of

protection provided against intrusion (body parts such as hands and fingers), dust, accidental contact, and water by mechanical casings and electrical enclosures for electrical equipment such as portable outlets.

b. Check any operating controls are in good working order, that they are secure, aligned and appropriately identified.
c. Check covers and guards are secured and working in the manner intended by the manufacturer or supplier.
d. Check ventilation inlets and exhausts are unobstructed.
e. Inspect pins of insulated pin plugs for damage to the pins insulation, and, if fitted, inspect the shroud on cord extension sockets for damage.
f. Check the current rating of the plug is consistent with the current rating of the equipment.

Testing

(21) Testing of earthing continuity, insulation, portable isolating transformers, operation of residual current devices (RCDs), polarity of rewireable plugs, portable generators, arch welders with exposed terminals, portable inverters and Class 1 equipment must be carried out by a competent person. The requirements of Tables 2.1 and 2.2 in AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment specify the leakage current limits and insulation resistance limits for such testing.

Action for non-compliant equipment

(22) Equipment that fails the inspection or testing must be appropriately tagged and withdrawn from service. A Danger Tag or Out of Service tag should be used to indicate that the equipment requires remedial action and CANNOT be used (examples of these tags are at Appendix 1). The equipment must be disconnected from all possible sources of electricity supply and rendered incapable of being made live in such a manner that it cannot be accidentally or unintentionally used until repaired (for example, locked out or locked away). For some items such as extension leads or EPODs, disposal may be the best course of action dependent on the extent of the fault.

Tags

(23) Equipment that passes inspection and testing must be fitted with tags that are durable, legible, non-reusable, non-metallic and may be colour coded. The date on which the test was performed must be indicated. In addition, the name of the person (company) who performed the test as well the date of next test must be indicated. Reference should also be made to AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment. An example of a compliant Electrical Test Tag is provided in Appendix 1.

Requirements for new electrical equipment

(24) The supplier of new electrical equipment is deemed responsible for the electrical safety of the equipment in accordance with the legislation and principles of safe design and manufacture. Regardless of this inherent manufacturer requirement, it is a University requirement to inspect, test and tag all new equipment prior to use.

(25) Hostile operating environment means a workplace where the electrical equipment or flexible supply cord is subject to operating conditions that are likely to result in damage to the equipment. This includes an operating environment that may: cause mechanical damage to the item of equipment; or expose the item of equipment to moisture, heat, vibration, corrosive substances or dust.

(26) Non-hostile operating environment means a workplace that is dry, clean, well organised and free of operating conditions that are likely to result in damage to electrical equipment or the flexible supply cord. For example, offices or classrooms.

a. Non-hostile office and office kitchen appliances/equipment: All office and office kitchen equipment in a non-hostile environment can be visually inspected by a competent person to ensure no damage has occurred during

shipment or commissioning and may then be made live prior to being tested and tagged. This equipment must then be tested and tagged at the earliest opportunity and in accordance with this procedure.

b. For equipment in non-hostile environments: Following inspection the new equipment that has been assessed as requiring future testing is to be fitted with a tag stating that the equipment is 'new to service', and the date of entry into service. This sets a baseline date for future electrical inspection and testing.
c. Hostile Environments: All new equipment purchased for use or potential use in workshops, laboratories, or for fieldwork must be tested and tagged before use or deployment into the field and then in accordance with this procedure.

Requirements for stationary electrical equipment

(27) Fixed Equipment means equipment that is fastened to a support, secured in position or otherwise due to its size and mass located in a specific location. Stationary Equipment means equipment having a mass exceeding 18 kg and not provided with carrying handle(s).

(28) Stationary or fixed equipment connected by a fixed cable or flexible cord which is not flexed in normal use or exposed to damage, nor in a higher-risk operating environment, is not normally considered to represent a hazard sufficient to warrant routine in-service electrical safety testing. Subject to the outcome of a risk assessment, the testing of such equipment is not normally required.

(29) In-service testing is required where flexible cables or cords are flexed on equipment that is moved only for restocking, maintenance, or cleaning. It is sufficient to conduct only a visual inspection and earth test on such fixed or stationary equipment.

(30) The categories in Table 1 – Electrical Equipment Categories list plug-in type electrical equipment that is commonly used in high-risk operating environments and does require regular inspection and testing.

Table 1 – Electrical equipment categories

Category of Equipment	Examples of Electrical Equipment to be Tested
Hand held electrical equipment	All hand held power tools Hairdryers (heat degradation) Kitchen appliances Laboratory Equipment
Portable electrical equipment moved while in operation	Floor polishers Vacuum cleaners Portable lighting equipment
Electrical equipment that is moved between operations in such a manner that could damage the flexible supply lead	Portable electronic whiteboards, Overhead projectors Electrical plant used in factory type environments Welding machines Extension cords – High Risk Power boards – High Risk
Electrical equipment that is used in a higher-risk operating environment where damage to the equipment or the electricity supply could occur such as in wet or dusty conditions.	Electrical equipment used in wet or dusty areas Electrical equipment used outdoors, in kitchens Certain Workshops and factory-type environments Laboratories (chemical or heat damage)

Requirements for desktop computers and office electrical equipment

(31) Not all electrical equipment requires regular testing. In some situations, electrical equipment such as desktop computers and stationary office equipment does not present a risk to their operators due to the:

a. Permanent nature of their location; and
b. Non-hostile working environment in which the equipment is used.

(32) In cases like these, a risk assessment should be carried out in accordance with the risk management provisions of the Regulations. The assessment should determine whether desktop computers and other similar stationary office equipment warrant regular testing and tagging at a greater frequency than the five yearly cycle recommended in this procedure.

University electrical testing and tagging guidance

(33) The following additional guidance is provided for all University Faculties, CDU TAFE and Operational areas. Table 2 – University testing and tagging requirements is the minimum standard for University electrical testing and tagging compliance for electrical equipment; it may occur at a greater frequency should an area choose to do so.

(34) Testing and tagging is arranged by submission of a Work Request to Facilities Management and paid for by the Faculty or organisational unit being tested and tagged.

Table 2 – University testing and tagging requirements

Type of Environment or Equipment	Interval	Comments
Extension Leads	6 monthly 12 monthly	If used in any type of workshop area or in any type of construction work or fieldwork. All other extension leads longer than 10m - Increased risk. In accordance with Appendix 1
EPODs for workshops and events	6 monthly 12 monthly	In workshops, construction sites, fieldwork For Events / activities
Workshops electrical equipment	6 monthly	In accordance with Appendix 2 or table 2.4 of AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment
Laboratories electrical equipment	12 monthly	In accordance with Appendix 2 or table 2.4 of AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment
Field work electrical equipment	12 monthly	Higher risk work activities and environmental risks
Training kitchens, hairdressing salon and bakery	12 monthly	Higher risk work activities and environmental risks
Power tools and electrical hand-tools	6 monthly	In accordance with Appendix 2 or table 2.4 of AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment
Non-Hostile office environment and extension leads	5 yearly	Provided they are being used in office spaces to supply electronic equipment
EPODs for offices spaces	5 yearly	Lower risk unlikely to be moved around frequently
Phone or tablet computer chargers (iPad)	5 yearly	Applies to both personal and/or University property
Office Equipment – non-hostile environment all computers, screens, docking stations, desk fans, desk lights	5 yearly	in accordance with Appendix 2 or table 2.4 of AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment
Office building kitchens Toasters, sandwich makers, refrigerators, coffee machines and kettle and extension leads	5 yearly	In accordance with Appendix 2 or table 2.4 of AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment
Stationary office equipment such as printers and laminators	5 yearly	In accordance with Appendix 2 or table 2.4 of AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment

Type of Environment or Equipment	Interval	Comments
RCD testing		In accordance with Appendix 2 or table 2.4 of AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment dependent on the type of hostile or non-hostile area

RCD testing

(35) All RCD testing MUST be in accordance with Appendix 2 or table 2.4 of AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment that outlines the required scheduling interval for all RCD testing.

Personal, lease or hire equipment

(36) The electrical inspection, testing and tagging requirements outlined in this procedure also apply to personal, leased or hired electrical equipment used in a hostile operating environment. If an employee, student or visitor refuses to allow testing, the equipment must be removed from the workplace. If any personal, leased or hired equipment fails testing the owner must be notified before any further action is undertaken. Testing must not damage any personal, leased or hired equipment.

(37) Employee, student or visitor personal IT devices (including laptops, tablets and phone chargers) used in a non-hostile environment do not require testing and tagging while on University property.

Documentation and record keeping

(38) The following records are required for the electrical testing and tagging program:

a. A record of all electrical inspections and tests;
b. A 'repair' register; and
c. A record of all faulty equipment showing details of services or corrective actions.

(39) Records are to be retained for in accordance with the University's WHS Records Management procedure.

Frequency of testing

(40) A risk assessment can be used to indicate the testing frequency. However, the guide in Appendix 2 or table 2.4 of AS/NZS 3760:2022 In-service safety inspection and testing of electrical equipment also provides indicative intervals.

Additional requirements for workshops, fieldwork and laboratories

(41) All electrical equipment used in workshops, fieldwork and laboratories have additional inherent mechanical, abrasive or crush risks as well as environmental risks from ongoing exposure to heat and moisture (high humidity or rain). To mitigate these risks, the standards listed in Appendix 3 apply to EPODs and extensions leads.

Risk assessment

(42) All electrical work on live electrical equipment must be carried out in accordance with a risk assessment. Refer to Hazard Identification, Risk Assessment and Control Procedure for further information.

(43) The risk assessment required in relation to prescribed 'high risk construction work' which includes construction work carried out on or near live electrical installations or services. The risk assessment must be developed in consultation with relevant workers. If the workers are represented by a health and safety representative (HSR), the consultation must involve that representative. The risk assessment prepared for live electrical work should describe consultation arrangements with the person, management or control of the workplace, including any authorisation

procedures and position descriptions. The risk assessment must:

a. Identify the electrical work.
b. Specify the hazards associated with that electrical work and risks to health and safety associated with those hazards.
c. Describe the measures to be implemented to control the risks.
d. Describe how the control measures are to be implemented, monitored and reviewed, and may include the risk assessment prepared for the relevant work.
e. Be written in a way that is easy to understand by the workers who are to use them. A copy must be readily accessible to any worker who is to carry out the electrical work covered by the statement.

(44) The risk assessment must be reviewed and revised as necessary if relevant control measures are revised under the Regulations. They must, for example, be revised if a decision is made to change relevant risk assessment at the workplace.

Section 5 - Non-Compliance

(45) Non-compliance with Governance Documents is considered a breach of the Code of Conduct - Employees or the Code of Conduct – Students, as applicable, and is treated seriously by the University. Reports of concerns about non-compliance will be managed in accordance with the applicable disciplinary procedures outlined in the Charles Darwin University and Union Enterprise Agreement 2022 and the Code of Conduct – Students.

(46) Complaints may be raised in accordance with the Complaints and Grievance Policy and Procedure - Employees and the Complaints Policy - Students.

(47) All employees have an individual responsibility to raise any suspicion, allegation or report of fraud or corruption in accordance with the Fraud and Corruption Control Policy and Whistleblower Reporting (Improper Conduct) Procedure.

Status and Details

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Implementation Officer	Anthony Clifford Senior Manager Work Health and Safety anthony.clifford@cdu.edu.au
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Glossary Terms and Definitions

"Faculty" - An organisational and academic unit in the University that delivers courses and conducts research.

"Organisational unit" - A faculty, centre or other academic unit; a department, or other administrative unit within the University.

"Voltage" - Voltage means differences of potential, normally existing between conductors and between conductors and earth as follows: Extra-low voltage (ELV) - not exceeding 50 volts alternating current (50 V a.c.) or 120 volts ripple-free direct current (120V ripple-free d.c.); Low voltage (LV) - exceeding extra-low voltage, but not exceeding 1000 volts alternating current (1000 V a.c.) or 1500 volts direct current (1500 V d.c.); or High voltage (HV) - exceeding low voltage.

"Competent person" - Competent person means a: licensed or registered electrician; licensed electrical inspector; or person who has completed a structured training course and been assessed as competent in the use of appliance testers and the visual inspection of electrical equipment.