



## In-service inspection and testing of electrical equipment

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### 1. Purpose and scope

Safety inspection and in-service testing of electrical equipment is a necessary part of the University's hazard management program to help ensure the safety of users of electrical equipment in the workplace.

This procedure outlines the planned arrangements and minimum standards for conducting safety inspection and testing of electrical equipment in university workplaces and applies to all University staff and students.

This procedure is prepared with reference to regulatory requirements set out in the WHS Regulations 2012 (SA), particularly regulations 144 to 151, and the following Safe Work Australia Approved Codes of Practice:

- **How to Manage Work Health and Safety Risks**
- **Managing Electrical Risks in the Workplace.**

In addition to the above Codes the following University of South Australia procedures apply:

- **Managing Workplace Health and Safety Risks**
- **Purchasing and Safety**
- **Safe Operating Procedure development.**

In designing and implementing local arrangements, reference is to be made as applicable to the best practice guidance specified in Australian Standard AS/NZS 3760: 2010: In-service safety inspection and testing of electrical equipment (Note: This standard is not adopted in South Australia as an Approved Code of Practice).

The scope of this procedure is the same as the scope of AS/NZS 3760:2010. It relates only to in-service equipment in university workplaces. It does not apply to fixed equipment or stationary equipment connected to wiring that forms part of the electrical installation and therefore falls within the scope of AS/NZS 3000. The program for inspection and testing of such electrical installations is the responsibility of Facilities Management Unit.



## 2. Definitions

**Applicable electrical equipment** – refers to, for the purposes of this procedure, those items of electrical equipment in the university which fall under the definition of regulation 150 (see section 4.1).

**Electrical equipment** – includes for the purposes of this procedure (based on the Australian Standard):

- portable equipment, hand-held equipment and stationary equipment, designed for connection to the low voltage supply by a supply cord, an appliance inlet or pins for insertion into a socket outlet
- cord sets; cord extension sets and outlet devices (also known as Electrical Portable Outlet Devices (EPODs) or power boards)
- portable residual current devices (RCDs)
- flexible cords connected to fixed equipment in a hostile environment
- portable power supplies
- battery chargers
- portable and transportable heavy-duty tools.

**Competent person** – in general terms, a person, who has acquired through training, qualification or experience the knowledge and skills to carry out the task. Specific competencies are recommended for persons conducting electrical testing.

**Hostile environment** – where the equipment or appliance is normally subjected to events or operating conditions likely to result in damage to the equipment or reduction in its expected lifespan. This includes but is not limited to mechanical damage, exposure to moisture, heat, cold, vibration, corrosive chemicals and dust. In the university context this will include many laboratory and workshop environments.

**Residual current device (RCD)** – a 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. An RCD may be fixed or portable (see illustrations in the Approved Code of Practice). Only portable RCDs are within the scope of this procedure.

## 3. Roles and Responsibilities

University roles and responsibilities for managing workplace health and safety risks, including those risks associated with electrical safety, are set out in the university procedure: *Managing Workplace Health and Safety Risks*.

Where a university 'workplace' is allocated a responsibility for an action, this term refers collectively to the Executive Dean or Director supported by all others with a safety responsibility in that workplace, whether that is supervisors, principal researchers, laboratory managers, technical staff, researchers or general academic and professional staff.



## 4. Procedure

### 4.1 Regulatory responsibility for inspection and testing

Under regulation 150 the University must ensure that electrical equipment is regularly inspected and tested by a competent person if the electrical equipment is:

- supplied with electricity through an electrical socket outlet, and
- 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.

All electrical equipment in the university which falls under the definition of regulation 150 is referred to, for the purposes of this procedure, as '**applicable**' equipment.

### 4.2 Principal workplace safety controls

All university workplaces using applicable electrical equipment shall implement the safety controls listed in Table 1. Applicable equipment will be identified through a systematic review of workspaces, work activities and the types of electrical equipment used. The listed safety controls will be noted in the Hazard Register for the workplace.

Workplaces comprising only lower risk work environments such as offices, staff kitchens and general teaching environments, and who only require a few items tested, are required to implement only safety controls 4 to 7 in Table 1.

**Table 1:**

1	Instigate a <b>program</b> of regular inspection and testing of all applicable in-service electrical equipment present in the workplace
2	Engage a <b>competent person</b> to carry out the required inspection and testing of all in-service electrical equipment (the 'competent person' may be an in-house staff member or a contracted electrical testing provider)
3	Maintain an <b>electrical equipment register</b> using form <b>WHS25</b> or equivalent
4	Check through visual inspection that <b>new equipment</b> is not showing signs of damage or wear
5	Check during regular <b>workplace inspections</b> that there are no visual signs of damage or wear to electrical equipment, that any applicable electrical equipment has been properly tested and tagged and that testing is up-to-date
6	<b>Report a hazard</b> if in the course of work it is noticed that an item of electrical equipment is showing signs of damage or wear or might be unsafe
7	Take appropriate <b>action</b> when equipment is identified as <b>non-compliant or might be unsafe</b> .



### 4.3 Provision of inspection and testing services

Each Academic/Central Unit or Research Institute is responsible for choosing and implementing the arrangement which is most suitable for its use of electrical equipment and work environment. The workplace may engage an external provider through its local cost centre or arrange training of selected staff to perform the testing in-house. The University of South Australia does not currently have a university-wide contractual or preferred provider arrangement with any external electrical inspection and testing provider.

### 4.4 Training and competence

A staff member, to be considered a 'competent person' for in-service electrical inspection and testing, must have 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.

A suitable training course is: *Conduct in-service safety testing of electrical cord connected equipment and cord assemblies*. This course is recorded on the national register as nationally recognised training with unit of competency code UEENEEP026A.

The competency shall be maintained through regular refresher training. The training competency shall be recorded in the local **Employee Licence and Certificate of Competency Register** (form **WHS30**).

A workplace shall only engage an external provider if the inspection and testing service staff possess as a minimum the same competencies as above.

### 4.5 Electrical equipment register

Each workplace shall maintain a register of all items of applicable electrical equipment including details of electrical testing performed, items identified as non-compliant and actions taken with these items. Form **WHS25 Electrical Equipment Register** shall be used or a similar form recording equivalent information. The register may be based on a spreadsheet or form supplied by an external provider. The register may also be combined or merged with related registers such as the plant register.

### 4.6 Workplace inspections and electrical safety

In the course of regular workplace inspections electrical equipment will be checked for signs of damage or wear and whether electrical testing and tagging is up-to-date. Observations and any need for follow up action will be recorded using the Electrical Safety section of form **WHS16 Worksite Inspection General Environment** or form **WHS17 Worksite Inspection Laboratory Environment**.

### 4.7 Deciding what needs to be tested

#### 4.7.1 Testing according to the level of risk

The Regulations and Approved Code of Practice permit the University to adopt a risk management approach to determining the need for and frequency of inspection and testing taking into account:

- the **level of risk of the work environment** in which the electrical equipment is used: e.g. a workshop is considered higher risk
- the **operating conditions** under which the equipment is used, e.g. wet or dusty, presence of corrosive substances, proximity of hot objects, outdoors
- **how the equipment is treated** and any potential damage or electrical hazards.

This approach represents a significant digression from past industry and university testing practices where it was not unusual to test and tag every item of electrical equipment. Some workplaces may not need to undertake any electrical testing and tagging at all.



Other university workplaces that are developing a program of inspection and testing may use their discretion after assessing the level of risk for each item of equipment or types of equipment as above.

#### 4.7.2 Lower risk workspaces: offices and teaching spaces

As noted in the Approved Code of Practice, items of electrical equipment used in lower risk operating environments **do not require inspection and testing or tagging**. Lower risk workplaces include those workplaces that are dry, clean, well-organised and free of the operating conditions described in regulation 150 that are likely to result in damage to electrical equipment. In the university context these would normally be:

- office environments
- standard teaching environments eg classrooms, tutorial rooms, lecture theatres
- staff kitchens.

Electrical equipment commonly used in these types of lower risk workplaces includes computers, photocopiers, kitchen appliances or AV equipment.

Safety controls for low risk workplaces are listed as points 4 to 7 in Table 1 in section 4.2. If a small number of electrical items are considered to require testing then this may be arranged by lodging a Customer Service Request with Facilities Management Unit.

Lower risk workplaces should still be alert to and monitor the condition of electrical equipment. They should also check that second-hand or hired equipment has been properly tested and tagged by the previous owner or hirer. If it is noticed that electrical equipment is damaged, suffering from wear or might be unsafe a hazard should be reported and as appropriate a Customer Service Request lodged.

#### 4.7.3 Higher risk workspaces: workshops, laboratories, studios, outdoors

Higher risk workplaces are (as described in the Approved Code of Practice) those in which electrical equipment is exposed to operating conditions that are likely to result in damage to the equipment or a reduction in its expected life span. In the university context these conditions might be encountered in:

- workshops
- some types of laboratories or studios
- commercial kitchens
- outdoor environments, events or public exhibitions.

In such cases each workspace will need to be reviewed to identify applicable items of equipment and determine the overall degree of testing. From this review a program for inspection and testing will be prepared and put in place as illustrated in the diagram in the Appendix.

#### 4.7.4 Equipment introduced into the University

Equipment introduced into the university includes new, second-hand or hired equipment, or personal items brought from home.

*New equipment:* In higher risk workplaces, applicable new equipment must be inspected for obvious damage before being used. When equipment is new, the supplier is deemed responsible for the initial electrical safety of the new equipment. New equipment need not be inspected or tested by a competent person until the next scheduled testing period unless on visual inspection there are signs of damage. Applicable new equipment in higher risk workplaces should be tagged with a 'new to service' tag in accordance with AS/NZS 3760 and noted on the electrical equipment register.

*New portable RCD units:* Should be tested by pressing the 'trip test' button to ensure the RCD is effective.

*Second-hand or hired equipment:* This equipment shall be tested before first use, unless already tested and tagged by the previous owner or hire company.



*Personal electrical items brought from home:* If used only a few times portable RCD protection must be provided. For longer term use the item is treated as second-hand and must be tested and tagged before continuing use. Where fans or heaters are brought into the work environment for temperature comfort a Customer Service Request should be lodged with Facilities Management Unit for a review of the effectiveness of the local air-conditioning.

#### **4.7.5 Untested electrical equipment**

Other than new equipment as above, applicable electrical equipment in higher risk workplaces is not to be used if the equipment has not been tested.

#### **4.7.6 Repaired equipment**

Electrical equipment should be tested after a repair or servicing that could affect the electrical safety of the equipment (normally conducted by those carrying out the repair or service). Refer to AS/NZS 5762:2005 In-service safety inspection and testing - Repaired electrical equipment.

#### **4.7.7 Equipment out of service**

Some work areas place electrical equipment out of service and place into storage (otherwise known as 'mothballing') as the equipment is only used seasonally or infrequently. In this case, the equipment must be fitted with an out of service tag and placed into a locked store room or similar. Such equipment would only require testing prior to re-commissioning and subsequent use (if the test date has expired or there is no test tag). The item of electrical equipment must still be listed on the local **Electrical Equipment Register** with a note to test and tag prior to use.

### **4.8 Testing frequency**

For each item of applicable electrical equipment listed on the **Electrical Equipment Register** a frequency of testing is to be recorded.

The frequency of repetition of the testing process is determined by the equipment type and by examination of the environment in which the equipment is used or working. A standard frequency of testing can be set for different types of workspaces e.g. offices, laboratories, but there will usually be multiple circumstances within any location and the inspecting/testing frequency should be arrived at by risk assessment of the actual workspace in which each item of equipment is placed or used.

As a general rule electrical equipment used in higher risk workplaces should be tested at least every twelve months, but more frequent testing (say, every six months) may be required for some workspaces (e.g. workshops) or uses of electrical equipment. Local areas using a risk assessment approach may reduce the frequency of testing or choose to have some electrical items tested more regularly.

An indicative testing and inspection interval table is offered as a guide in Table 4 (pp 20-21) of the Australian Standard (see References). A number of environments are shown in column (a) of Table 4 for indicative purposes, based on the perception of the level of hazard and the degree of abuse to which the equipment is typically exposed.

### **4.9 Actions resulting from inspection and testing**

Non-compliant equipment (equipment that is faulty or may be unsafe) shall be:

- a) withdrawn from service immediately (including disconnection or isolation from its electricity supply), have a label attached to it warning against further use; and
- b) sent for repair, disposal or destruction
- c) not reconnected until it is repaired or tested and found to be safe.



Compliant equipment shall be fitted with a tag which should be colour coded to identify the period in which the test was done and shall include:

- the name of the person or company who made the inspection or carried out the test or maintenance
- the test, inspection or maintenance date
- a re-test date if required.

Testing results obtained by in-house staff or an external provider shall be provided to the workplace as a register (or suitable for inclusion in a register) identifying non-compliant equipment. The corrective action taken is to be recorded for each item of non-compliant equipment.

#### 4.10 International adaptors

As a special electrical safety consideration, in-service electrical equipment fitted with international adaptors is non-compliant with the requirements of Australian Standards. Any international/overseas plugs or adaptors in use must be replaced with Australian fittings.

### 5. Performance Measures

- All workplaces with higher risk workspaces have implemented a program of regular testing and tagging of applicable in-service electrical equipment based on risk assessment
- All identified items of in-service electrical equipment in higher risk workspaces have been tested and tagged as necessary.

### 6. University Documents/Forms

For further advice on managing risks in university workplaces, including procedures, guidance, forms and training courses, please visit the Safety & Wellbeing website.

#### Safety & Wellbeing website

- Managing Workplace Health and Safety Risks
- Purchasing and Safety
- Safe Operating Procedure development
- WHS25 – Electrical Equipment Register
- WHS16 – Worksite inspection general environment
- WHS17 – Worksite inspection laboratory environment
- WHS30 – Employee Licence and Certificate of Competency Register

Note: Form **WHS26 - RCD Register** is now rescinded.

#### Online Hazard/Incident Reporting & Investigation System

### 7. References

SafeWork SA Resources—WHS legislation and Approved Codes of Practice:

- Work Health and Safety Act 2012
- Work Health and Safety Regulations 2012
- How to Manage Work Health and Safety Risks
- Managing Electrical Risks in the Workplace.

Australian Standards online (UniSA subscription)

- AS/NZS 3760:2010 In-service safety inspection and testing of electrical equipment
- AS/NZS 5762:2005 In-service safety inspection and testing - Repaired electrical equipment.



## Appendix: Review of workspaces to determine need for testing based on risk

