6.05.16 Inspection and Testing of Electrical Equipment

Directorate | Business and Governance
---|---
Responsible Officer | Executive Manager

Contents

Inspection and Testing of Electrical Equipment

Introduction 2
Responsibilities 2
  Leadership Executive Group (LEG) 2
  Managers and Coordinators 2
Electrical testing and tagging process 3
  Identify Electrical Equipment Requiring Testing 3
  Testing and Tagging of Electrical Items 4
  Visual Inspections of Electrical Equipment 5
  Defective and Damaged Items 6
Monitor and review 6
Record keeping 6
Reference Documents 6
Appendix 1: Definitions 8
Introduction

In accordance with the *Work Health and Safety Regulation 2017*, a person conducting business or undertaking works must ensure electrical equipment is regularly inspected and tested by a competent person. In meeting its duty of care to workers, Council is committed to ensuring compliance with its statutory and other obligations in relation to electrical safety. The purpose of this procedure is to provide the requirements and guidelines Bega Valley Shire Council will use to effectively manage electrical safety risks. This procedure applies to all electrical equipment used at any worksite under the management or control of Bega Valley Shire Council.

Responsibilities

Leadership Executive Group (LEG)

The following responsibilities have been allocated to all members of the Leadership Executive Group:

- Ensure adequate resources are available to enable effective inspection and testing of electrical equipment;
- Ensure Council processes are in place to ensure that electrical equipment is effectively identified, inspected and tested in line with WHS legislative requirements and related standards;
- Ensure processes are in place to monitor the implementation of electrical inspection and testing; and
- Ensure that processes are in place for the review of this procedure every two years.

Managers and Coordinators

The following responsibilities have been allocated to all BVSC managers and coordinators:

- Ensure that electrical equipment that requires inspection and testing is identified in their area of responsibility and the items added to the Electrical Equipment Register;
- Ensure that regular electrical inspection and testing is conducted by competent persons for all specified equipment at the required frequencies;
- Ensure that all damaged, defective or non-compliant equipment is removed from use immediately;
- Ensure that any persons involved in the inspection and testing of equipment have appropriate qualifications and/or received appropriate training;
- Monitor and periodically review the implementation and effectiveness of the electrical inspection and testing process and revise if necessary.

Employees:

The following responsibilities have been allocated to all BVSC managers and coordinators:

- Participate in identifying electrical hazards or equipment requiring regular inspection and testing; and
- Participate in reviewing the effectiveness of the electrical inspection and testing process, where required.
- Report electrical faults to their supervisor;
- Visually inspect electrical equipment, plugs, leads and socket outlets for obvious damage prior to use; and
- Use the correct electrical equipment for the specific task;
Electrical testing and tagging process

Council will develop and implement the electrical testing and tagging process as outlined in the flowchart below:

Identify electrical equipment requiring inspection and testing (Section 3.1) → Develop Electrical Equipment Register

Conduct testing and tagging of identified equipment (Section 3.2) → Update Electrical Equipment Register

Conduct visual inspections of electrical equipment (Section 3.3)

Remove any defective equipment (Section 3.4)

Monitor and Review (Section 4)

Record Keeping (Section 5)

Identify Electrical Equipment Requiring Testing

The relevant coordinator, team leader and/or asset owner is responsible for identifying higher risk electrical equipment requiring inspection, testing and tagging. This will be done by assessing the risk of damage presented by the use and operating environment of the equipment. Higher risk equipment that requires inspection and testing includes electrical equipment with one or more of the following features:

- hand held – moved during use (e.g. power hand tools);
- portable – frequently moved from one location to another (e.g. electrical welders, portable bench saws);
- has a supply cord that is subject to abuse (e.g. electric kettles, toasters, extension leads);
- has a supply cord that is subject to frequent flexing (e.g. extension leads, vacuum cleaners)

Priority will also be given to electrical equipment that is operated in hostile environments where there is an increased chance of the electrical equipment being damaged through mechanical impact, moisture, dust, heat, etc. These environments include:

- outdoors;
- construction and demolition sites;
• workshops,
• workplaces that use corrosive substances, and
• commercial kitchens.

Refer to Appendix 1 for typical electrical equipment that requires inspection and testing.

**Equipment not Requiring Inspection and Testing**

Some low risk equipment generally does not require regular inspection and testing unless otherwise indicated through a risk assessment. This includes:

• office equipment such as printers, copiers, computers and telephones;
• fixed equipment that is connected by a fixed cable and not in a high-risk operating environment; and
• new electrical equipment that has never been used

**Electrical Equipment Register**

Electrical equipment that has been identified as requiring regular inspection and testing will be added to the Electrical Equipment Register (see Appendix 2) which will be maintained by the Assets Manager/Manager/Coordinator. This register will be used to record all testing conducted for that equipment.

**Testing and Tagging of Electrical Items**

The asset owner will ensure that regular testing is conducted to detect electrical faults and deterioration for all electrical equipment identified as higher risk. Testing must be undertaken by a person competent to undertake the required testing. The results of the tests will be added to the Electrical Testing Register.

The frequency of testing will follow the requirements outlined in AS/NZS 3760:2010 and will depend on factors such as the nature of the electrical equipment, how it is used and its operating environment. The frequency of testing for different type of equipment and operating environments is shown in Appendix 3.

**Testing of Residual Current Devices (RCD)**

The asset owner must ensure that RCDs used in the workplace are tested regularly by a competent person to ensure that the devices are working effectively. All RCDs must be tested in accordance with AS/NZS 3760. The following types of test are required:

• The Push Button Test to determine the RCDs tripping time
• The Operating Test Time that measures how long the RCD takes to trip

Refer to Appendix 4 for further information on RCDs

**Testing Requirements for Construction Sites**

Specific testing requirements apply for construction and demolition sites because of the increased risk of damage to equipment.

Electrical equipment connected by a plug and socket that is used on construction and demolition sites will be inspected and tested at least once every three months. More frequent testing may be required as indicated by a site-specific risk assessment.

Both fixed and portable RCDs must be tested regularly. Push button tests for fixed RCDs will be conducted every month and portable RCDs will be tested by the user before each use of the equipment.

Refer to Appendix 5 for further details about testing frequencies for equipment used for construction
**Hired Equipment**

All hired electrical equipment is to be inspected and tested at the commencement of each hire. If the equipment is hired for an extended period of time, it must be tested every three months.

**Personal Equipment**

Workers wishing to bring personal electrical equipment to the workplace must first receive approval from their coordinator. If allowed, the asset owner is to ensure that the item is tested and tagged prior to first use.

Any purchased second-hand electrical equipment must also be tested and tagged prior to use.

**Equipment Brought by Contractors**

Any electrical equipment introduced into the workplace by contractors is subject to the same inspection and testing requirements as equipment owned by Council. Contractors must be able to demonstrate that any electrical equipment used on Council work sites complies with the requirements of this procedure.

**Equipment Test Tags**

All equipment that has been tested must have a tag attached that provides the following details:

- asset number (unique identifier) if any;
- the name of the person or company performing the test;
- the test date/next test date due; and
- the test status.

**Visual Inspections of Electrical Equipment**

All plug-in electrical equipment is to be visually inspected regularly for obvious faults. Inspection of electrical equipment includes looking for any of the following defects:

- damaged lead including fraying, cuts or heavy scuffing;
- damaged plug (e.g. to the cover or bent pins);
- discolouration that may indicated exposure to excessive heat, moisture or chemicals;
- make-shift repairs (e.g. leads joined together with tape);
- ineffective anchoring of the flexible leads to the equipment and plugs (coloured wires visible where the lead joins the plug);
- damaged outer cover of the equipment, including loose screws or loose / cracked parts;
- missing external covers or guards;
- signs of overheating (e.g. burn marks; staining on the plug, lead or part of the equipment); and
- damage due to use / storage in wet or dusty environments.

Visual inspections will be conducted according to the following frequencies:

- New equipment will be visually inspected prior to first use;
- Infrequently used equipment will be visual inspected prior to each use;
- Regularly used equipment that is not subject to electrical tag and testing will be visually inspected annually;
- Equipment used in hostile environments such as construction sites will be inspected by the user before each use;
All visual inspection should be done when the equipment is disconnected.

**Defective and Damaged Items**

If electrical equipment is identified as damaged, defective or non-compliant, it must be removed from use immediately. Removing defective and damaged items from service can be accomplished by one of the following methods:

- Cutting the plug off and disposing of the item
- Applying an Out-of-Service tag to the piece of equipment, pending further inspection, repair and testing.

Common low cost electrical items (e.g. power boards and power leads) that are damaged will be immediately disposed of, but more expensive or specialist equipment may warrant repair. All electrical repairs must be done by a qualified person. The coordinator will ensure that any electrical equipment that has been repaired for an electrical problem or fault is inspected, tested and tagged before its return to service.

4. **Monitor and review**

The asset owner will monitor and periodically review the implementation and effectiveness of the electrical inspection and testing process and revise if necessary to ensure that the associated risks are minimised as far as is reasonably practicable.

A review of this procedure will be conducted every two years or if:

- it becomes apparent that the electrical inspection and testing process is not adequate to protect workers;
- there are legislative changes that affect the electrical inspection and testing process; or
- if the need for a review is raised through Council's consultation process.

Asset owners will provide the Risk team with information on any related incidents or near misses, new identified risks and/or the status of any corrective actions.

**Record keeping**

All records relating to electrical tag and testing will be maintained by the asset owner and will include:

- An Electrical Equipment Register/ record of formal inspection and tests (including the date and outcome of the testing);
- A repair register; and
- A record of all faulty equipment showing details of services or corrective actions

**Reference Documents**

- *Work Health and Safety Act 2011 (NSW)*
- *Work Health and Safety Regulation 2017 (NSW)*
- Code of Practice: Managing Electrical Risks in the Workplace 2015 (SafeWork NSW)
- AS/NZS 3000:2007 Electrical Installations (known as the Australian/New Zealand Wiring Rules)
- AS/NZS 3100:2009 Approval and test specification – General Requirements for Electrical Equipment
- AS/NZS 3105:2012 Approval and Test Specification - Electrical Portable Outlet Devices
- AS/NZS 5762:2011 In-service safety inspection and testing – Repaired electrical equipment
### Appendix 1: Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
</table>
| Competent Person                  | A person who has acquired through training, qualification or experience the knowledge and skills to correctly undertake the tasks of electrical testing and tagging of electrical equipment. Examples include:  
  ● a licensed electrician  
  ● a licensed electrical inspector  
  ● a person who has successfully completed a structured training course, and has been deemed competent in the use of a pass-fail type portable appliance tester as well as the visual inspection of electrical equipment. |
| Fixed Equipment                   | Equipment using mains voltage, which is fastened to a support, secured in position, or otherwise, due to its size and mass, located in a specific position.                                                                 |
| Hostile Environment               | An environment which exposes the equipment to conditions that are likely to result in damage or a reduction in its expected life span, including conditions that involve exposure to moisture, heat, vibration, mechanical damage, corrosive chemicals or dust. For example:  
  ● Workshops  
  ● Commercial Kitchens  
  ● Depot yard areas and Waste Facilities  
  ● Swimming pools  
  ● Sewer / Water treatment yard areas and pumping stations |
| Portable Electrical Equipment     | Equipment that is plugged into mains voltage (240V), which can be readily moved from one place to another or can be moved while in operation.                                                                 |
| Power Pack                        | Commonly known as a plug pack, power supply unit, AC adaptor, phone/camera charger. (240V input - low voltage (5V) output and do not require test and tag)                                                                 |
| Private Electrical Equipment      | Electrical equipment that is owned by an employee or contractor and not provided by council but has been approved for use on council premises                                                                 |
| Residual Current Device (RCD) – Fitted: | Is a safety switch which is fitted inside the power distribution boxes of most buildings that will automatically cut power to the circuit / outlet in less than 300milli seconds when it senses a fault condition. |

![Typical fixed RCD fitted in a switchboard](image-url)  
![Outlet style fitted RCD](image-url)
<table>
<thead>
<tr>
<th>Residual Current Device (RCD) – Portable:</th>
<th>Is a portable safety switch that will automatically cut power to the outlet / equipment in less than 300 milli seconds when it senses a fault condition.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Portable single RCD within a cable." /></td>
<td><img src="image2" alt="Four outlet portable RCD unit. Typical style used at Council." /></td>
</tr>
</tbody>
</table>

Residual Current Device (RCD) – Portable:

- Portable single RCD within a cable.
- Four outlet portable RCD unit. Typical style used at Council.
Appendix 2: Electrical Equipment Register

### Electrical Equipment Register

<table>
<thead>
<tr>
<th>DESCRIPTION OF PLANT</th>
<th>ID/SERIAL OR REGO NUMBER</th>
<th>LAST INSP’N DATE</th>
<th>NEXT INSP’N DATE</th>
<th>COMMENTS</th>
<th>TESTED BY:</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
### Appendix 3: Recommended Testing Intervals

<table>
<thead>
<tr>
<th>Environment</th>
<th>Interval between Inspection and Tests</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Electrical Equipment NOT used in construction</td>
<td>Push button test by user</td>
<td>Operating time and push button test</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Portable RCD</td>
<td>Fixed RCD</td>
<td>Portable RCD</td>
<td>Fixed RCD</td>
<td></td>
</tr>
<tr>
<td>Workshops, factories, places of work or repair</td>
<td>6 months</td>
<td>Daily or before every use</td>
<td>6 months</td>
<td>12 months</td>
<td>12 months</td>
</tr>
<tr>
<td>Equipment or supply is subject to flexing in normal use OR is open to abuse OR is in a hostile environment</td>
<td>12 months</td>
<td>3 months</td>
<td>6 months</td>
<td>12 months</td>
<td>12 months</td>
</tr>
<tr>
<td>Equipment or supply is NOT subject to flexing in normal use and is NOT open to abuse and is NOT in a hostile environment</td>
<td>5 years</td>
<td>3 months</td>
<td>6 months</td>
<td>2 years</td>
<td>2 years</td>
</tr>
<tr>
<td>Residential areas, halls</td>
<td>2 years</td>
<td>6 months</td>
<td>6 months</td>
<td>2 years</td>
<td>2 years</td>
</tr>
<tr>
<td>Equipment used for commercial cleaning</td>
<td>6 months</td>
<td>3 months</td>
<td>N/A</td>
<td>12 months</td>
<td>N/A</td>
</tr>
<tr>
<td>Hire equipment</td>
<td>3 months</td>
<td>Prior to use</td>
<td>3 months</td>
<td>3 months</td>
<td></td>
</tr>
<tr>
<td>Repaired, serviced and second hand equipment</td>
<td>After repair or service which could affect electrical safety, or on reintroduction to service (refer AS/NZS 5762)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: In-service Safety Inspection and Testing of Electrical Equipment. AS/NZS 3760:2010*
Appendix 4: Use of Residual Current Devices

RCD protection is required for the following electrical equipment and depending on the type of appliance, installation and environment, the RCD protection may be provided by either portable or fixed RCDs.

- Hand held electrical equipment, including power tools, hair dryers and electrical knives;
- Electrical equipment which is moved during operation, including vacuum cleaners, floor polishers, extension cords, power boards, portable lighting.
- Electrical equipment which is moved between operation where damage to the equipment or supply cord could occur, including electrical welders, portable bench saws, audio visual equipment, extension cords and power boards.
- Where electrical safety could be affected by the operating environment:
  - Appliances used in wet areas such as kettles and other kitchen appliances;
  - Electrical equipment is used in an environment where it is exposed to moisture, heat, vibration, mechanical damage, corrosive chemicals or dust.
- Extension cords used externally are to have portable RCDs attached or are to be integrated as part of the extension cord.

Refer to the Code of Practice: Managing Electrical Risks in the Workplace - Appendix B Portable RCDs for further guidance.

Equipment that does not need RCD protection:

- Extra low voltage equipment (less than 50v AC);
- Equipment supplied by direct current systems;
- Equipment supplied from an isolated winding from an unearthed generator that provides an equivalent level of protection;
- Equipment supplied from an isolating transformer that provides an equivalent level of protection;
- Specialised scientific equipment where the use of an RCD may compromise the operation of the equipment or safety of a patient. (However, steps should be taken to ensure a high level of safety is maintained such as a more frequent and extensive testing program).

Inspecting and testing RCDs

Council must take all reasonable steps to ensure that residual current devices used at the workplace are tested regularly by a competent person to ensure the devices are working effectively. This includes the two types of test required for RCDs:

- The manual push button (Trip) test to determine the RCDs tripping function and approximate tripping time.
- The leakage to Earth (10mA or 30mA leakage) operating time test - using an electrically isolated RCD test instrument.

A record of testing (other than daily testing) must be kept until the device is next tested or disposed of.
## Appendix 5: Inspection and Testing Intervals for Construction Sites

<table>
<thead>
<tr>
<th>Equipment Class</th>
<th>Testing Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction wiring including switchboards</td>
<td>Inspected and tested at time of installation, then re-inspected every 6 months</td>
</tr>
<tr>
<td>Relocatable structures, fixed and transportable equipment</td>
<td>6 months</td>
</tr>
<tr>
<td>Portable plug in equipment and flexible electrical cords</td>
<td>3 months</td>
</tr>
<tr>
<td>Equipment in amenities and site office</td>
<td>3 months</td>
</tr>
<tr>
<td>Portable RCDs – push button test</td>
<td>Before each use of equipment</td>
</tr>
<tr>
<td>Portable RCDs – operating time</td>
<td>1 monthly</td>
</tr>
<tr>
<td>Fixed RCDs – push button test</td>
<td>1 month</td>
</tr>
<tr>
<td>Fixed RCDs – operating time <em>(including fixed to portable generators)</em></td>
<td>12 months</td>
</tr>
<tr>
<td>Hire equipment</td>
<td>Upon introduction to service then in accordance with the relevant testing intervals for the equipment class</td>
</tr>
</tbody>
</table>