



Government of **Western Australia**  
Department of Mines, Industry Regulation and Safety  
**Building and Energy**

# Safe working guidelines for electrical workers



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## Preface

This booklet covers basic electrical safety practices to be followed by electrical workers.

It provides advice on achieving and maintaining safe work practices, for the benefit of the individual worker and for the benefit of others. In particular, it provides guidelines on providing effective supervision of electrical workers with varying competencies.

Every electrical worker must be constantly vigilant about the dangers involved in working with electricity. **The danger is real.**

These Guidelines are designed to complement general and specific workplace safety requirements in the *WA Occupational Safety and Health Act 1984*, the *Occupational Safety and Health Regulations 1996* and the *Electricity (Licensing) Regulations 1991*. In all instances the requirements of the Act and the Regulations prevail.

*Every care has been taken to ensure references to legislation, Australian Standards and other documents in the Guidelines are accurate at the time of publication.*

*However, amendments to these documents are made from time to time and the reader should always check to ensure that applicable referenced information is current.*



# 1. Responsibilities

## General

Employer and employee responsibilities for maintaining workplace safety are set out in Sections 19 and 20 of the *Occupational Safety and Health Act 1984*.

**Employers** have the primary duty of care to maintain a safe working environment for employees by providing information and training, safe work procedures, safety equipment and effective supervision.

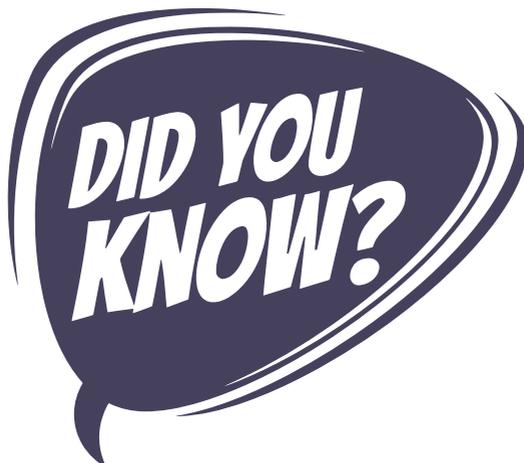
**Employees** also have a duty of care to ensure their own safety and to avoid any act or omission which adversely affects the safety of others during the performance of their work. Employees must cooperate with employers, follow safe work procedures and use protective equipment.

## Licensing

Both the employer and the employee have the responsibility to ensure that the employee has the appropriate current licence, as set out in the Electricity (Licensing) Regulations 1991 (Licensing Regulations), to lawfully perform electrical work on behalf of the employer, while observing any restrictions applicable to the individual licence.

## Work standards

Supervising electrical workers are responsible for checking and testing all electrical work carried out by an apprentice or person undergoing training to ensure compliance with the Licensing Regulations. (This includes compliance with AS/NZS 3000 Wiring Rules and other technical standards listed in Schedule 2 of these regulations.)



## 2. Supervision of electrical workers

Electrical accidents and fatalities have occurred when electrical workers were not adequately supervised. Such incidents are clearly preventable.

### Effective supervision

Whether you are an employer, supervising electrical worker or an electrical worker under supervision, it is important to understand your obligations under the Licensing Regulations.

These guidelines will assist in understanding these obligations and for improving workplace safety.

### What is effective supervision?

The importance of **effective** supervision is recognised by Regulation 50 of the Licensing Regulations. In particular, Regulations 50, 50AA and 50AB provide detailed requirements for effective supervision of workers for the purpose of preventing danger to life and property.

Effective supervision includes, but is not limited to, the following:

- ensuring that all workers are licensed to carry out the required work;
- adequate job planning, risk assessment and risk mitigation;
- ensuring the supervising electrical worker has the necessary knowledge and skill levels for the type of work to be undertaken;
- giving due consideration to the level of training, knowledge and skill of the electrical worker(s) who are being supervised; and
- managing the number and proximity of electrical workers to enable the required level of oversight and clear lines of communication.

The responsibility for providing effective supervision of electrical workers rests with employers and supervising electrical workers. In deciding on the appropriate level of supervision for an electrical worker on a particular scope of work or task, the supervising electrical worker must consider all relevant factors including, but not limited to, the following.

### (1) The type of work

Variations in the work environment, whether related directly to electricity supply or not, present many different circumstances and risks. Supervising electrical workers must assess these risks when determining safety requirements for the job at hand and the level of supervision appropriate for the electrical worker. These include, but are not limited to:

- work type and location e.g. residential, commercial, mining, etc.;

- new construction or alteration/addition to an existing installation; or
- proximity to energised electrical equipment on the site and the voltage and maximum fault current of that equipment.

## **(2) Knowledge and skills of the employee**

The supervising electrical worker must assess the technical knowledge and practical skills of the electrical worker using information available from both academic and on-the-job training records.

The level of supervision needed for safe working must reflect this assessment.

## **(3) Competence of the supervising electrical worker**

Employers must ensure that supervising electrical workers have the necessary competencies to provide effective supervision of another electrical worker, including:

- being licensed to carry out the electrical work without supervision;
- appropriate technical knowledge, skills and experience in regard to the particular work to be performed;
- effective communication skills; and
- preferably, formal training in supervision of other workers.



## **Levels of supervision for apprentices**

Three different levels of supervision are defined in detail in Regulation 49D and briefly summarised below:

### **(1) Direct supervision**

“Direct” supervision applies where the apprentice requires constant guidance and monitoring by the supervising electrical worker to ensure the work task is carried out safely and correctly.

The supervising electrical worker must remain on the same work site as, and in close proximity to, the apprentice.

## (2) General supervision

“General” supervision applies where the apprentice requires periodic guidance and monitoring to ensure the work task is carried out safely and correctly.

The supervising electrical worker must remain on the same work site as the apprentice and be readily available to provide guidance and assistance.

## (3) Broad supervision

“Broad” supervision applies where the apprentice does not require ongoing guidance and monitoring while performing familiar tasks.

The supervising electrical worker does not need to remain on the same site as the apprentice but must, as a minimum, attend the work daily to provide initial instruction and to verify the electrical work has been carried out safely and correctly.



## Determining appropriate levels of supervision for apprentices

The level of guidance required by an apprentice can be expected to diminish gradually over the course of the apprenticeship, as increasing competence is attained and demonstrated by the apprentice.

However, the appropriate level should be applied at any time based on the supervising electrical worker’s assessment of the apprentice’s competence to perform each task. For example, a task being performed for the first time or in an unfamiliar environment in the final year of training may initially require direct supervision for that particular task.

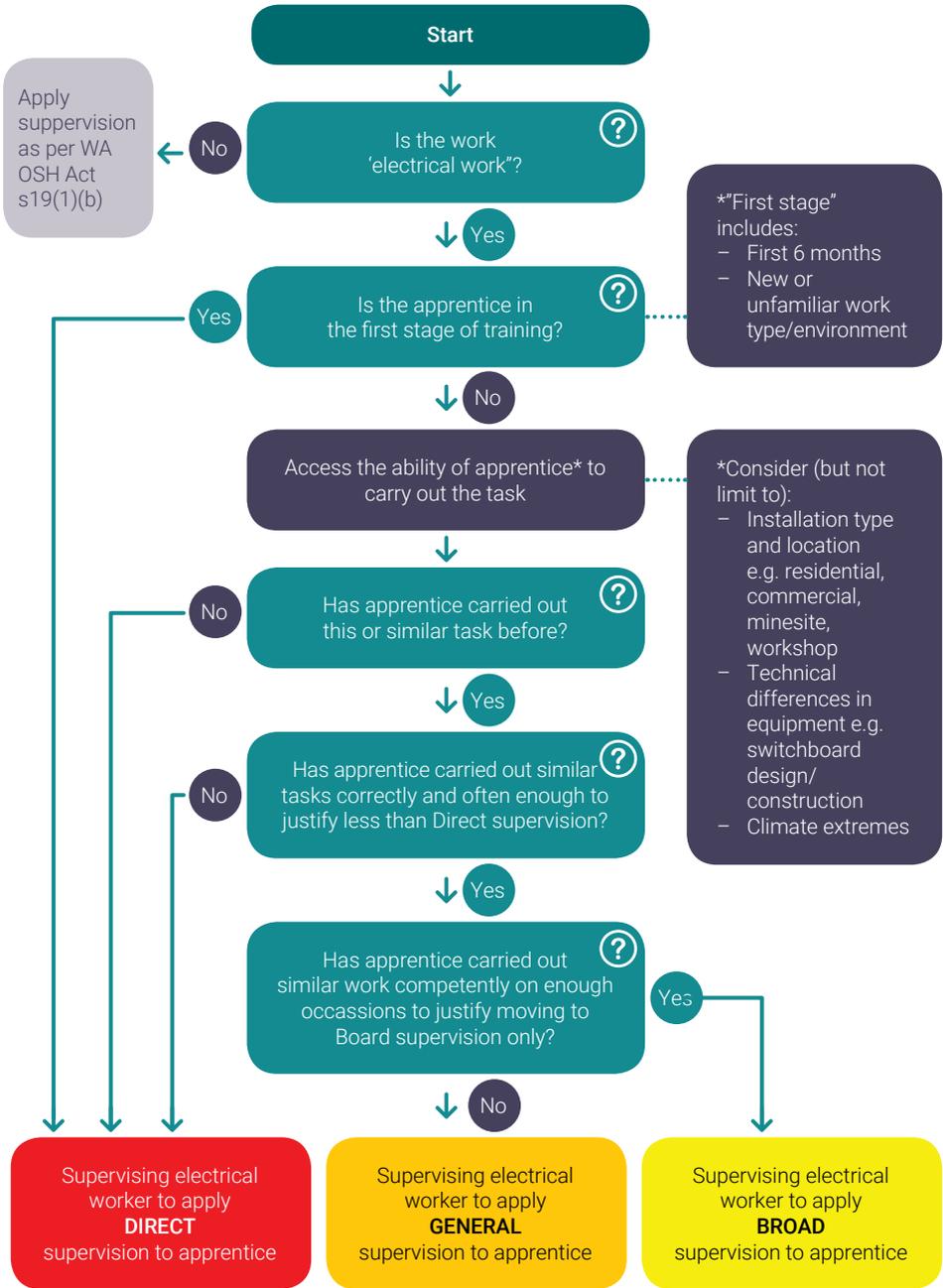
The following table provides guidance to employers and supervising electrical workers on appropriate **minimum** levels of supervision of apprentices at different stages of training and for different work types (**de-energised only**), subject to assessment by the supervising electrical worker.

Type of work ( <u>de-energised</u> only)	Apprentice training year	Recommended <u>minimum</u> supervision level
New electrical installations ( <i>not connected to electricity supply</i> )	1st 2nd 3rd 4th or final	General General Broad Broad
Maintenance, alterations and additions to existing electrical installations ( <i>isolated and proven de-energised by supervising electrical worker</i> )	1st 2nd 3rd 4th or final	Direct General General Broad
Workshop assembly and maintenance of electrical equipment ( <i>not connected to electricity supply</i> )	1st 2nd 3rd 4th or final	General General Broad Broad
Tag and lockout procedure on de- energised installations and equipment ( <i>isolated and proven de-energised by supervising electrical worker</i> )	1st 2nd 3rd 4th or final	Direct General General Broad
Testing and fault-finding on de- energised installations and equipment ( <i>not connected to electricity supply or isolated and proven de-energised by supervising electrical worker</i> )	1st 2nd 3rd 4th or final	Direct Direct General General

The levels of supervision applied in practice may vary from the recommended minimum levels subject to a diligent assessment by the supervising electrical worker of the nature of the work, the specific circumstances and risks, and the competence of the apprentice to perform the task.

The following flowchart illustrates the appropriate steps for the supervising electrical worker to carry out such an assessment.

# Assessing the appropriate level of supervision for an apprentice (de-energised work only)





## De-energisation of equipment – apprentice to verify

From the start of workplace training, apprentices should, after de-energisation of the circuit or equipment by the supervising electrical worker and prior to commencing work, **always**:

- participate in the tag and lockout procedure by applying personal tags and locks; and
- ‘TEST BEFORE YOU TOUCH’ – personally verify, by electrical testing, that the circuit or equipment is de-energised.

The appropriate level of supervision for an apprentice performing this task is shown in the previous table.

## Supervision of apprentices and restrictions for work on or near energised equipment

Work on or near **energised** electrical circuits and equipment by any electrical worker is prohibited by the Licensing Regulations except in certain prescribed circumstances and subject to performing a detailed risk assessment and formal documentation of a safe work method statement.

The Licensing Regulations permit an electrical apprentice to carry out isolation, testing and fault finding on energised equipment in the following **strictly limited circumstances, in combination**:

- **only** in the **final year of training**;
- **only** if assessed by the supervising electrical worker as being **competent** to perform the task safely; and

- **only** under **direct supervision**, with the supervising electrical worker in close proximity to the apprentice for the duration of the task.

In all cases, the supervising electrical worker is responsible for the risk assessment, safe work method statement, instruction and direct supervision of the apprentice and final verification and testing of the work.

Section 6 of these Guidelines provides further information about where and how work, by any person, on or near energised electrical equipment is permitted.



## Before apprentices commence work

Before an apprentice commences any electrical work the supervising electrical worker must:

- be confident that the apprentice is fit for work;
- ensure there are no exposed live parts and the electrical equipment is de-energised and safe to be worked on or near;
- clearly instruct the apprentice on which tasks he/she is expected to do and which ones he/she must not be doing until he/she is instructed on how to do the tasks. Confirm that the apprentice understands the work instructions;
- advise the apprentice which level of supervision applies to the work and confirm the apprentice understands the limitations this applies to the work;
- ensure that the apprentice is equipped with the necessary personal protective equipment (PPE) and tools and understands how to use them correctly; and
- where the equipment has been de-energised to allow work to be carried out on or near, ensure that the apprentice:
  - has applied their personal lock and danger tag at the isolation point(s); and
  - has verified by an electrical test that the equipment is de-energised – TEST BEFORE YOU TOUCH.

### 3. Dangers of working with electricity

#### Electrical risks

The most common electrical risks and causes of injury are:

- **Electric shock** causing injury or death.
- **Burns** from arcing, explosion or fire.
- **Falls** from ladders, scaffolds or elevated work platforms (EWPs) as a direct consequence of an electric shock.
- **Poisoning** from toxic gases causing illness or death.
- **Fire** resulting from an electrical fault.

It only requires a very small failure of a work practice, such as a slip with a screwdriver or a dropped tool, for such accidents to occur.



#### Electric shock

**All electric shocks must be avoided**

**All electric shocks are potentially fatal**

Minor shocks could have resulted in death or injury had circumstances been only slightly different.

Electric shock is the effect produced on the body, particularly the nervous system, by an electrical current. The effect varies depending upon the magnitude, path and frequency of the current and the duration of contact. (Even the briefest contact with electricity can have serious consequences.)

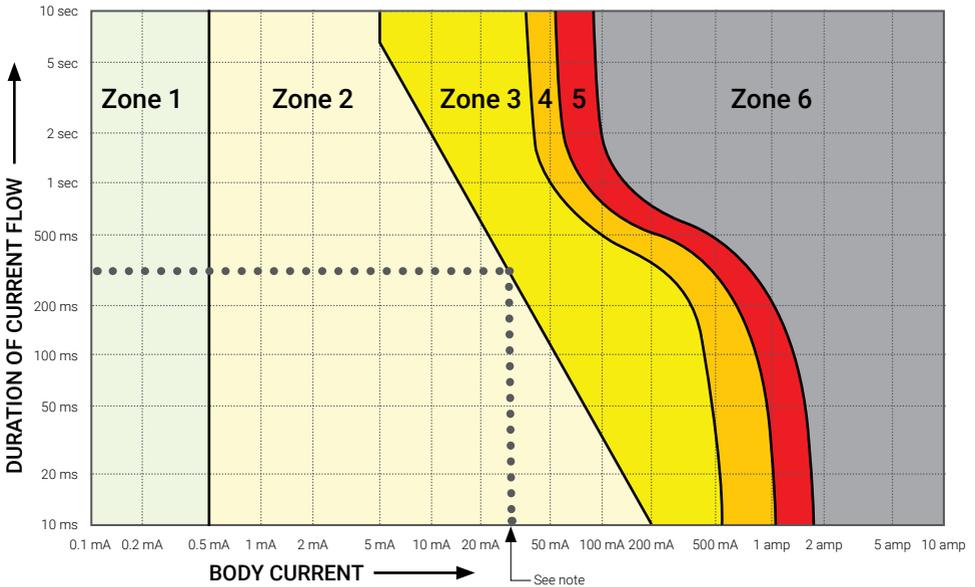
If the current magnitude is within a certain range and its path traverses the heart region, the normal rhythm of the heart can be interrupted. In this state, known as ventricular fibrillation, the heart contracts randomly and cannot maintain blood circulation. Return to normal rhythm rarely occurs spontaneously and if the condition persists for more than a few minutes, the result is almost certain to be fatal.

Electric shock may also stop the heart completely and/or the victim's breathing.

The likely **physiological effects** of electric shock on a healthy adult are illustrated in the following two figures<sup>1</sup>, for variations in the amount of electric current flowing through the body and time of exposure:

Zone	Effects of electric shock on the human body	
1	Perception possible but usually no 'startled' reaction	
2	Perception and involuntary muscular contractions likely but usually no harmful effects	
3	Strong involuntary muscular contractions. Difficulty in breathing. Reversible disturbances of heart function. Immobilisation may occur. Effects increasing with current magnitude. Usually no internal organ damage expected.	
4	Patho-physiological effects may occur:	Probability of ventricular fibrillation up to about 5 per cent
5	<ul style="list-style-type: none"> <li>• cardiac arrest</li> <li>• breathing stops</li> </ul>	Probability of ventricular fibrillation up to about 50 per cent
6	<ul style="list-style-type: none"> <li>• burns</li> <li>• internal organ damage</li> </ul> Injuries may result in <b>DEATH</b> .	Probability of ventricular fibrillation above 50 per cent

<sup>1</sup> Adapted from AS/NZS 60479.1:2010 'Effects of current on human beings and livestock – General aspects'



Note: The standard 30 mA RCD operates within 300 milliseconds for a circuit current imbalance of 30 mA, providing effective protection against potentially lethal high body currents (Zones 3, 4, 5 and 6).



## Burns

Electrical arcing occurs when electrical insulation between conductors can no longer withstand the applied voltage or is bridged by conductive material.

Electricity flashovers/arcs can produce extreme temperatures, very high forces and toxic gases, and persons in the vicinity commonly suffer severe burns, permanent disfigurement or fatal injuries.

The risk of injury from arcing or explosion is extreme when high fault currents are present. This typically applies to low voltage circuits close to transformers or switchboards, where the electrical protection may only detect and interrupt an arcing fault slowly or not at all.

Arcing faults can occur at any time for a variety of reasons. However, they generally occur as a result of an external influence which, typically, may involve the actions of an electrical worker, for example during maintenance or energisation of equipment.

**An arc flash hazard is effectively eliminated if work is undertaken on a completely de-energised switchboard and no switching operations are performed manually.**



### **Falls**

Falls from ladders, scaffolds or other elevated work platforms can occur as a direct consequence of an electric shock or arc blast, potentially resulting in serious injury or death.



### **Poisoning**

Burning and arcing associated with electrical equipment may release various harmful gases and contaminants. Inhalation of these dangerous products may cause short term or chronic illness or result in death from suffocation.



### **Fire**

Electrical workers may not be the only ones at risk. Faulty electrical equipment and poor standards of work can lead to fires that may cause injury or death to persons using the installation and property loss.



## 4. Safe working practices

### Before starting work

- Plan the job carefully, including a risk assessment and isolation requirements.
- Ensure all workers have the appropriate PPE and its condition is satisfactory. PPE will provide only limited protection from electrical risks such as electric shock, arc flash and arc blast.
- If work is in the vicinity of energised electrical equipment and if required by the risk assessment, ensure workers have a low voltage (LV) rescue kit.
- Check if the upstream electrical protection has a maintenance setting that enables an immediate circuit trip if any fault occurs.
- Confirm permission to isolate (comply with any access or vicinity permit system applicable to the site).
- Isolate the electrical equipment or circuit.
- Secure the isolation by fitting personal locks and “Danger” or “Out of Service” tags (as applicable) on the isolating device(s).
- Erect safety barriers where required.
- Cover adjacent live apparatus with insulating barriers where required to do so by the risk assessment.
- **TEST BEFORE YOU TOUCH – Always test for no voltage before starting work (check test instruments before and after every test).**
- Ensure test instruments are fit for purpose and adequately rated (e.g. Category IV etc.).
- Use the correct earthing equipment.
- Start work only when authorised to do so.

**If in doubt about anything, seek confirmation before starting work.**



## When working

- Always wear the PPE required for the work.
- Use only the correct tools and safety equipment for the work.
- Never put yourself or others at risk.
- Use safety observers where required.
- Never rely on your memory about work conditions – if unsure about anything, check visually or re-test.
- Disconnect conductors in order – the active first, the neutral second and the earth last.
- Connect conductors in order – the earth first, then the neutral and the active last.
- Check the isolation points and re-test before resuming work after a break – TEST BEFORE YOU TOUCH.



## On completion of work

- Check that tools are not left on or in the job.
- Remove personal earthing equipment (where applicable).
- Check that the work is complete and has been tested.
- Notify all personnel directly involved in the work that the equipment will be energised.
- Remove your “Danger” or “Out of Service” tags and locks.
- Check all “Danger” tags, “Out of Service” tags, earths and locks have been removed by other workers.
- Remove and store all safety barriers and other equipment.
- Relinquish your work permit (if relevant).
- Energise equipment and confirm correct operation, including restoration of normal electrical protection settings (if applicable).

## **Safety practices**

- Keep a well maintained first aid kit handy.
- Know the electric shock and resuscitation procedure.
- Know where fire extinguishers are located and how to operate them.
- Know the correct type of fire extinguisher for the various types of fires.
- Keep your work place clean and orderly.
- When working near energised electrical equipment, have an LV rescue kit for immediate use if required.
- Report all electrical accidents to your employer (who must report the accident immediately to the relevant network operator).

## **Tools**

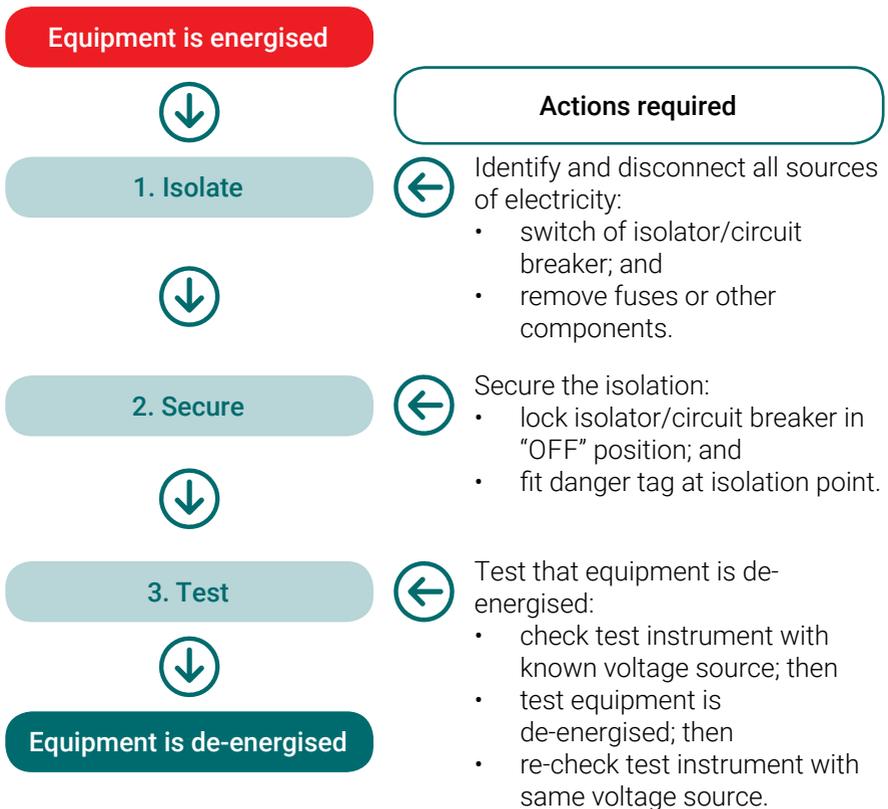
- Use the correct tools for the job at hand.
- Regularly check, clean and maintain all tools and equipment and recertify (where applicable).
- Use residual current devices (RCDs) when using plug-in electric tools.
- Use insulated ladders.
- Use approved safety harnesses and other equipment.
- Use non-conducting tape measures when working on or near electrical equipment.

## 5. Electrical isolation and de-energisation of equipment

Before commencing any electrical work, the circuits or equipment to be worked on must be disconnected from all sources of electricity supply, the isolation points physically secured to prevent inadvertent re-energisation, and proven to be de-energised.

Principles and safe practices for the effective de-energisation of electrical circuits and equipment are provided in Building and Energy's "Code of Practice for Persons working on or near energised electrical installations"<sup>2</sup>. The key steps are summarised below for reference.

### Essential steps for effective de-energisation of equipment



<sup>2</sup> The associated national technical standard is AS/NZS 4836:2011 – Safe working on or near low-voltage electrical installations and equipment

## Securing the isolation

### Locks

Where a facility exists to lock a switch in the “OFF” position, it must be used. Where a facility does not exist, a portable lock out device (“lock dog”) must be fitted to the switch mechanism to prevent closing.

Locks are for the safety of personnel and:

- they must be uniquely keyed so that they can be fitted and removed only by the person owning the lock;
- all persons involved in carrying out the work must fit their own lock at the same isolation point(s). This may require the use of a multi-lock security device;
- they must be clearly labelled (with a personal identification tag or Danger tag) to identify the owner and the nature of the electrical work being undertaken; and
- they must be removed upon completion of work or at the end of the shift (if the work will be continued by others, who must fit their own locks).

### Danger tags

A Danger tag on an item of equipment is a warning to all persons that the equipment must not be operated, as lives may be placed in danger.

Danger tags are for the safety of personnel and:

- they must be attached in a prominent position at each isolation point;
- they must be fitted and removed only by the person who signed the tag;
- all persons involved in carrying out the work must fit their own Danger tag at the same isolation point(s); and
- they must be removed upon completion of the work or at the end of the shift (if the work will be continued by others, who must fit their own Danger tags).



## Out of Service tags

This tag is used to identify appliances or equipment that are out of operation for repairs or alterations or are still in the process of being installed. While an Out of Service tag is fitted, the appliance or equipment must not be operated.

Out of Service tags are for the safety of personnel and security of equipment and must be:

- attached in a prominent position at the point of isolation of the appliance or equipment that is being worked on; and
- fitted and removed only by authorised persons.



## 6. Work on or near energised electrical equipment

### Work on or near energised electrical equipment is generally prohibited

Electrical installing work must not be carried out on or near energised equipment except in the circumstances and manner as defined in Regulation 55 of the Licensing Regulations.

These exceptions do not apply to work carried out by, or on behalf of, a network operator on a network, including service apparatus.

The exceptions and approach to restricted work on energised electrical equipment are summarised in the following sections for ease of reference.

The limited circumstances in which energised work is permitted and the strict precautions that are required to maintain safe working conditions are prescribed in the:



- Occupational Safety and Health Regulations 1996; (OSH Regulations)
- Electrical (Licensing) Regulations 1991;
- Code of Practice for Persons working on or near energised electrical installations (published by Building and Energy); and
- The Commission for Occupational Safety and Health's Guidance note - Work in roof spaces 2018.

### Exceptions

Work on or near energised electrical equipment may only be undertaken where the supervising electrical worker has determined it is the only practical option because:

- (1) it is necessary that the electrical equipment to be worked on is energised in order for the work to be carried out effectively (e.g. testing, commissioning, switching, fault-finding);
- (2) de-energising that part of the installation would put the health and safety of a person at significant risk (e.g. it may be necessary for life-saving equipment to remain energised and operating while electrical work is carried out on the premises); and
- (3) a risk assessment demonstrates that the risks can be reduced to a minimum practical level to enable the work to be performed safely.

Note: Loss of production by itself is not a satisfactory reason for working on energised equipment.

## Where work on or near energised equipment is the only option

The required approach to carrying out live electrical work is set out in:

- Regulation 55 of the Licensing Regulations; and
- Regulation 3.143 of the Occupational Safety and Health Regulations 1996.

In summary, the regulations require that:

- (1) A comprehensive risk assessment must be conducted by a competent person, who may be the supervising electrical worker. The risk assessment must consider, but not be limited to:
  - the fault level;
  - specific arc flash containment within the design of the equipment;
  - likely direction of an arc blast; and
  - adequacy of electrical protection settings.
- (2) The identified risks and control measures implemented must be documented in a written “safe work method statement” and a record kept for at least two years after the work is completed.
- (3) The work must be undertaken only:
  - in accordance with the pre-determined work method; and
  - by competent persons who have the necessary tools, equipment and PPE for the work.

Further detailed guidance is provided in the “Code of Practice for Persons working on or near energised electrical installations”.

## Work in the vicinity of energised electrical equipment

In some circumstances, the risks associated with undertaking electrical work **near** energised equipment can be equivalent to those associated with work on energised electrical equipment.

Detailed guidance is provided in the “Code of practice for Persons working on or near energised electrical installations”, where the term “**near**” has the meaning given in Regulation 54A(2) (of the Licensing Regulations):

*“... a person carries out electrical work near an energised part of an electrical installation if, the person may make contact, directly or indirectly (including with a thing used or controlled by the person), with an uninsulated energised part of the electrical installation.”*

A risk assessment must be performed by a competent person to determine the risk level associated with working near energised electrical equipment and appropriate risk control measures must be implemented and documented in the safe work method statement.

## Work in roof spaces

The OSH Regulations generally prohibit workers entering the roof spaces of buildings unless the electrical installation is de-energised.

However, persons licensed to carry out electrical installing work may enter a roof space without de-energising the electrical installation provided a risk assessment has been performed to determine the risk level and appropriate risk control measures have been documented in a safe work method statement and implemented.

**Caution:** After isolating the network supply and in-built energy sources (such as direct or inverter connected generators and batteries) to the extent that isolation facilities permit, energised cables and equipment may still be present on roofs, in ceiling spaces and wall cavities, associated with:

- network service apparatus; and
- on site generators or batteries.

Further guidance is provided in the “Commission for Occupational Safety and Health’s Guidance Note – Work in roof spaces 2017”.



## Precautions required for installations with embedded generators or batteries

When working on installations with in-built energy sources (such as direct or inverter connected generators and batteries), extra care is required to ensure that workers are not exposed to the risk of contact with energised wiring or equipment even when the network supply has been isolated.

Following isolation of such energy sources at the main switchboard, inverter or the source itself (to the extent that facilities permit), energised cables and equipment may still be present on roofs, in ceiling spaces and wall cavities and hazardous voltages may still exist at terminals within electrical enclosures.

## Apprentices – additional restrictions for work on or near energised equipment

As stated in Section 2 of this document, the Licensing Regulations permit an electrical apprentice to carry out isolation, testing and fault finding on energised equipment in the following **strictly limited circumstances, in combination**:

- **only** in the **final year of training**;
- **only** if assessed by the supervising electrical worker as being **competent** to perform the task safely; and
- **only** under **direct supervision**, with the supervising electrical worker in close proximity to the apprentice for the duration of the task.

In all cases, the supervising electrical worker is responsible for the risk assessment, safe work method statement, instruction and direct supervision of the apprentice and final verification and testing of the work.



## 7. Personal protective equipment (PPE)

### General

The use of protective clothing and equipment is an essential part of working safely. Many electrical workers have avoided serious injury or death because of the clothes and other PPE they were wearing at the time.

Appropriate clothing and PPE provide some (limited) level of protection from:

- electric shock;
- flash burns resulting from an arcing fault; and
- mechanical impacts.

#### Limitations of PPE



**PPE cannot be relied on as the sole risk control measure to provide full protection from electrical hazards**

**PPE should be used in conjunction with other risk control measures and be considered as the final safety measure**

PPE must comply with the relevant legislation and Australian or International technical standards. In particular:

- (1) The OSH Regulations provide general requirements and technical standards for PPE used in Western Australia.
- (2) AS/NZS 4836 (Section 9) provides a selection guide for PPE for various types of electrical work.
- (3) The Energy Networks Australia publication ENA NENS 09-2014 provides comprehensive guidelines for the selection, use and maintenance of PPE for electrical arc hazards.

### Responsibilities

**Employers** must:

- ensure their employees wear suitable everyday work clothes and footwear and basic PPE to carry out their work safely;
- provide additional safety equipment required for specific electrical work tasks, such as insulated gloves, insulated covers/barriers and thermally rated clothing; and
- ensure that employees are trained in the correct use and care of their PPE so that it provides the level of protection intended.

**Employees** must wear suitable clothes and footwear at all times and use the additional protective equipment provided for the work in the correct manner.

Every electrical worker must ensure that:

- they always use PPE appropriate for the work undertaken;
- their co-workers also use the appropriate PPE; and
- they maintain their PPE in good condition and replace any defective items.

**When you are issued with PPE, look for the relevant Australian/New Zealand Standard marking, rating, classification and certification expiry date.**



## Basic PPE

Information about basic (minimum) items of PPE is provided in the following sections, for easy reference and guidance.

### Safety footwear

Safety footwear provides protection from:

- electric shock; and
- falling objects.

Safety footwear must:

- be non-conductive; and
- comply with technical standard AS/NZS 2210.



### Safety glasses

Safety glasses provide protection from:

- flying objects caused by activities such as grinding and cutting; and
- electrical arcs (limited protection only).

Safety glasses must:

- have non-conductive frames; and
- comply with AS/NZS 1337.



## Work gloves

Work gloves provide protection from mechanical impact in relation to tools, equipment and work materials.

Gloves must:

- have no conductive fasteners such as zips or studs;
- be made of durable material appropriate for the required work; and
- comply with technical standard AS/NZS 2161.



## Safety helmets

Many work sites require safety helmets to be worn at all times. They provide protection from contact with:

- overhead wires/structures; and
- falling objects.

All helmets must be:

- non-conductive; and
- comply with AS/NZS 1801.



## RCDs

RCDs on fixed or portable socket outlets provide additional **protection against electrocution** in the event of electric shock due to:

- inadvertent energisation of equipment being worked on; or
- a malfunction of portable electric tools and extension leads.



RCD protection must be provided in the workplace as required by:

- Regulation 3.60 of the OSH Regulations; and
- technical standard AS/NZS 3012, Electrical installations – Construction and demolition sites.

RCDs should be tested for correct operation before commencing work.

## Protective clothing

Many work sites require full body cover protective clothing to be worn at all times. This is also required for certain types of electrical work, such as testing and fault-finding.

Clothing provides some (limited) level of protection from:

- electric arcing/flash burns;
- flying or falling objects; and
- electric shock.

Protective clothing for electrical work should cover the body completely and:

- be of material with properties equivalent to 185gsm 100 per cent cotton drill or better;
- have non-conductive and concealed buttons;
- have sleeves to wrist length; and
- have legs reaching to the footwear.

Additional care should be taken to ensure clothing is reasonably close fitting and remains fastened to avoid catching or entanglement. This is particularly important when working in the vicinity of any moving machinery or rotating equipment.



## **Additional PPE**

For general work, other types of PPE commonly required are:

- hearing protection (earplugs or earmuffs); and
- respiratory protection (breathing masks).

Additional PPE should be considered for some types of electrical work, such as testing and fault-finding. Depending on the assessment of the risks involved, this may include:

- flame retardant clothing;
- insulated gloves;
- arc rated equipment – clothing, gloves, face shield, etc.;
- insulating covers/mats;
- low voltage (LV) rescue kit; and
- safety harness.

Guidelines about specific forms of PPE appropriate for electrical workers are provided in AS/NZS 4836 (Section 9) and ENA NENS 09-2014.

## 8. Rescue and resuscitation

**All electrical workers and their assistants should have current rescue and resuscitation skills.**

The recommended method of CPR (cardiopulmonary resuscitation) is that published by the Australian Resuscitation Council in their Guideline 8 – Cardiopulmonary Resuscitation.

The key elements of this CPR method are reproduced in Appendix 1 for use as a reference only.

Detailed steps in the recommended CPR method are subject to variation from time to time. All electrical workers should regularly refresh their knowledge of the procedures (recommended annually).

Further information and training in rescue and resuscitation procedures is available from recognised training providers.



## 9. Reporting and investigation of electrical accidents

The Licensing Regulations require the reporting and investigation of electrical accidents, including electrical shocks.

### Reporting

- Electrical workers must report all electrical accidents (including minor electrical shocks) to their employer.
- The employer is then required to notify the relevant network operator about the incident.
- In remote areas of Western Australia where there is no network operator, an electrical accident must be reported to Building and Energy Division. This should be done by telephoning:

**FREECALL 1800 678 198** (all hours)



This phone number is for use within Western Australia only.

- The employer must also notify WorkSafe about electrical accidents as prescribed in Section 231(3) of the Occupational Safety and Health Act and Regulation 2.4 of the OSH Regulations.

### Investigation

Electricity network operators and Building and Energy investigate all electrical accidents, including electric shocks. In this way, the cause of the incident can be determined and actions can be taken to minimise the risk of a recurrence.

# Appendix 1 – Recommended emergency life support procedures

This information is reproduced from the Australian Resuscitation Council Guideline 8 Cardiopulmonary Resuscitation (as published in January 2016)

## Basic Life Support

**D** Dangers?

**R** Responsive?

**S** Send for help

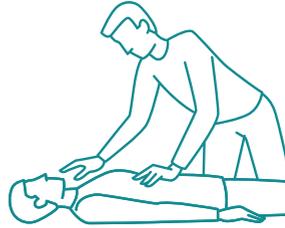
**A** Open Airway

**B** Normal Breathing?

**C** Start **CPR**  
30 compressions: 2 breaths

**D** Attach **Defibrillator (AED)**  
as soon as available and follow its prompts

Continue CPR until responsiveness or normal breathing return



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Feedback on any aspect of this document is encouraged.  
Comments and suggestions may be sent to:

Director of Energy Safety  
Locked Bag 100 East Perth WA 6892 or  
Email: [energysafety@dmirs.wa.gov.au](mailto:energysafety@dmirs.wa.gov.au)

## **Department of Mines, Industry Regulation and Safety**

### **Building and Energy**

Level 1 Mason Bird Building  
303 Sevenoaks Street  
(entrance Grose Avenue)  
Cannington Western Australia 6107

Telephone: (08) 6251 1900  
Facsimile: (08) 6251 1901

### **Mailing address**

Locked Bag 100  
East Perth WA 6892

### **Online**

Website: [www.dmirs.wa.gov.au/energysafety](http://www.dmirs.wa.gov.au/energysafety)  
Email: [energysafety@dmirs.wa.gov.au](mailto:energysafety@dmirs.wa.gov.au)

### **Energy incident notification (24 hours) 1800 678 198**

National Relay Service: 13 36 77

If you require the services of an interpreter, contact the  
Translating and Interpreting Services (TIS) on 13 14 50  
and ask for connection to Building and Energy on  
6251 1900. This publication is available on request in  
other formats to assist people with special needs.