Electrical Safety Code of Practice 2020

Electrical equipment rural industry

Queensland Government

This Queensland code of practice has been approved by the Minister for State Development and Infrastructure, Minister for Industrial Relations and Minister for Racing under section 44 of the *Electrical Safety Act 2002.*

This code commenced on 2 January 2020.

ESOPDF025

Contents

Legislative framework

The *Electrical Safety Act 2002* (the ES Act) is directed at eliminating the human cost to individuals, families and the community of death, injury and destruction that can be caused by electricity. The ES Act establishes a legislative framework for preventing persons from being killed or injured by electricity and preventing property from being destroyed or damaged by electricity. The ES Act places the primary electrical safety duty on a person conducting a business or undertaking, who must ensure the business or undertaking is conducted in a way that is electrically safe. Duties are also placed on officers of a person conducting a business or undertaking, workers and other persons at a workplace, as well as electricity entities, designers, manufacturers, importers, suppliers, installers, repairers and persons in control of electrical equipment.

The *Work Health and Safety Act 2011* (WHS Act) requires persons who have a duty to ensure health and safety to 'manage risks' by eliminating health and safety risks so far as is reasonably practicable, and if it is not reasonably practicable to do so, to minimise those risks so far as is reasonably practicable. The WHS Act provides a framework to protect the health, safety and welfare of all workers at work. It also protects the health and safety of all other people who might be affected by the work. The WHS Act places the primary health and safety duty on a person conducting a business or undertaking, who must ensure, so far as is reasonably practicable, the health and safety of workers at the workplace. Duties are also placed on officers of a person conducting a business or undertaking, workers and other persons at a workplace.

In terms of electrical safety, where the ES Act and the WHS Act both apply, the ES Act takes precedence.

Foreword

This Code of Practice on how to manage risks associated with electrical equipment in rural industry workplaces is made under section 44 of the ES Act.

A code of practice is a practical guide to achieving the standards of electrical safety required under the ES Act and the Electrical Safety Regulation 2013 (the ES Regulation).

A code of practice applies to anyone who has an electrical safety duty in the circumstances described in the code. In most cases, following a code of practice would achieve compliance with the electrical safety duties in the ES Act, in relation to the subject matter of the code. Like regulations, codes of practice deal with particular issues and do not cover all hazards or risks that may arise. Health and safety and electrical safety duties require duty holders to consider all risks associated with work, not only those for which regulations and codes of practice exist.

Codes of practice are admissible in court proceedings under the ES Act and ES Regulation. Courts may regard a code of practice as evidence of what is known about a hazard, risk or control and may rely on the code in determining what is reasonably practicable in the circumstances to which the code relates.

Compliance with the ES Act and ES Regulation may be achieved by following another method, such as a technical or an industry standard, if it provides an equivalent or higher standard of electrical safety than the code.

An inspector may refer to a code of practice when issuing an improvement or electrical safety protection notice.

Scope and application

This Code provides practical guidance about how to manage electrical risk in rural industry work. This Code should be used by persons conducting a business or undertaking which includes rural industry work, to ensure that their electrical safety duties are met.

This Code applies to plug-in and fixed electrical equipment used in rural industry work, for example:

- wiring systems, either inside or outside a building
- switchboards where fuses and circuit breakers and other electrical items are located
- overhead electric lines and associated equipment such as poles and cross arms
- portable power tools such as drills and grinders
- pumps and generators
- electrical equipment used where stated electrical risk factors apply, such as when electrical equipment is used in wet areas or where equipment is subject to harsh treatment
- areas where safety switches may be required.

The Code provides for the following ways of managing electrical safety duties:

- visual examination and assessment of the entire electrical installation, noting any defects and arranging for them to be rectified
- assessing for the presence of risk, including stated electrical risk factors
- managing the stated electrical risk factors associated with electrical equipment by:
  - assessing the risks and implementing risk control measures
  - using safety switch protection or regular testing and inspection
  - visually checking all electrical equipment prior to use or connection
  - continuing to monitor work areas and electrical equipment on an ongoing basis.

This Code does not apply to:

- work that is not rural industry work.
- repair of consumer electrical equipment when unplugged from any electrical socket outlet.

Meaning of rural industry work

As set down in section 99 of the ES Regulation, rural industry work is work:

- in the cultivation of any agricultural crop or product whether or not grown for food
- in the rearing and management of farm animals for example livestock, bees or worms
- in the classing, scouring, sorting or pressing of wool
- that is aquaculture
- in flower or vegetable market gardens
- at clearing, fencing, trenching, draining or otherwise preparing land for anything stated above.

Rural industry work includes work that is construction work, manufacturing work or office work performed for the purposes of an activity mentioned above if the work is:

- performed by a person conducting a business or undertaking, including by his or her worker, carrying on the business or undertaking in which the product of the construction work, manufacturing work or office work is to be used
- performed on premises on which the product of the construction work, manufacturing work or office work is to be used.

Examples of construction work or manufacturing work:

- repairing farm machinery, for example, tractors or implements
- making farm machinery, for example, cattle crushes, spray booms or fruit picking booms
- building sheds.

Rural industry work does not include work to which rural industry work is only incidental.

Examples:

- work in carrying on a farm stay
- work in conducting a tour associated with rural industry work.

Because rural industry work does not include other commercial activities such tourism that might be associated with a rural industry business, you will need to ensure that the relevant regulatory requirements for such other activities under the ES Act are complied with.

In addition, the ES Regulation for rural industry work and this Code do not alter any other regulatory requirements under the ES Act for electrical work. For example, a person performing licensed electrical work in a rural industry must hold a relevant electrical work licence and comply with other provisions for safe electrical work.

How to use this Code of Practice

This Code should be read in conjunction with the ES Act, the ES Regulation, the WHS Act, the Work Health and Safety Regulation 2011 (the WHS Regulation) and other relevant codes of practice.

In providing guidance, the word ‘should’ is used in this Code to indicate a recommended course of action, while ‘may’ is used to indicate an optional course of action. The terms ‘health and safety’ and ‘work health and safety’ are used in this Code to indicate a wider application than just ‘electrical safety’. However, ‘electrical safety’ should be taken as being included when the terms ‘health and safety’ and ‘work health and safety’ are used.

This Code also includes various references to provisions of the ES Act, the ES Regulation, the WHS Act and the WHS Regulation which set out the legal requirements. These references are not exhaustive. The words ‘must’, ‘requires’ or ‘mandatory’ indicate that a legal requirement exists and must be complied with.

This Code also includes various references to standards (using the designated ‘AS’) and joint standards (using the designated ‘AS/NZS’). In this Code, unless otherwise stated, a reference to a standard (or joint standard) is a reference to that standard (or joint standard) as in force from time to time under that designation. For example, ‘AS/NZS 3760’ is a reference to the joint standard that is currently in force under that designation.

Key terms used in this Code are defined at **Appendix A**.

1 Introduction

1.1 What are electrical risks?

Electrical risks are risks of death, electric shock or other injury caused directly or indirectly by electricity. The most common electrical risks and causes of injury are:

- **electric shock causing injury or death.** The electric shock may be received by direct or indirect contact, tracking through or across a medium, or by arcing. For example, electric shock may result from indirect contact where a conductive part that is not normally energised becomes energised due to a fault (e.g. metal body of automotive battery charger, fencing wire)
- **arcing, explosion or fire causing burns**. The injuries are often suffered because arcing or explosion or both occur when high fault currents are present
- **electric shock from 'step-and-touch' potentials**
- **toxic gases causing illness or death**. Burning and arcing associated with electrical equipment may release various gases and contaminants
- **fire resulting from an electrical fault**.

Even the briefest contact with electricity at 50 volts for alternating current (V AC) or 120 volts for direct current (V DC) can have serious consequences to a person's health and safety. High voltage shocks involving more than 1000 V AC or 1500 V DC can cause contact burns and damage to internal organs.

Electric shocks from faulty electrical equipment may also lead to related injuries, including falls from ladders, scaffolds or other elevated work platforms. Other injuries or illnesses may include muscle spasms, palpitations, nausea, vomiting, collapse and unconsciousness.

Workers using electricity may not be the only ones at risk—faulty electrical equipment and poor electrical installations can lead to fires that may also cause death or injury to others.

1.2 Who must manage electrical risks?

A **person conducting a business or undertaking** has the primary duty under the ES Act to ensure the person's business or undertaking is conducted in a way that is electrically safe. This duty includes:

- ensuring that all electrical equipment used in the conduct of the person's business or undertaking is electrically safe
- if the person's business or undertaking includes the performance of electrical work, ensuring the electrical safety of all persons and property likely to be affected by the electrical work
- if the person's business or undertaking includes the performance of work, whether or not electrical work, involving contact with, or being near to, exposed parts, ensuring persons performing the work are electrically safe.

The ES Regulation includes more specific requirements for managing electrical risks at the workplace. For example, all persons conducting a business or undertaking have duties in relation to specified electrical equipment, and any unsafe electrical equipment, at the workplace.

Persons conducting a business or undertaking carrying out electrical work must comply with the prohibition on electrical work on energised electrical equipment subject to certain exceptions.

Workers performing electrical installation work must be licensed to perform the work, and the person conducting a business or undertaking employing the licensed worker must ensure the worker is competent in the type of work being performed and testing and compliance requirements are met.

Where a person conducting a business or undertaking engages an electrical contractor for the performance of electrical work, the work must be performed under the supervision of the qualified technical person (QTP) as nominated on the electrical contractor licence. The electrical contractor should ensure effective supervision occurs.

Where the electrical work is performed by a licensed electrical worker employed directly by the PCBU, the PCBU should ensure adequate supervision is provided for the electrical work to be performed safely.

Persons in control of electrical equipment must ensure the electrical equipment is electrically safe.

Designers of electrical equipment or an electrical installation must ensure the electrical equipment or electrical installation is designed to be electrically safe.

Manufacturers of electrical equipment must ensure that the electrical equipment, when made, is electrically safe. The duty includes examining and testing the electrical equipment to ensure it is electrically safe.

Importers of electrical equipment must ensure the electrical equipment is electrically safe. The duty includes ensuring the electrical equipment is designed to be electrically safe and is tested and examined to ensure it is electrically safe.

Suppliers of electrical equipment must ensure that when the electrical equipment leaves the supplier, it is accompanied by information about the way the electrical equipment must be used to ensure that its use is electrically safe.

Installers of electrical equipment or an electrical installation must ensure the way in which the electrical equipment or electrical installation is installed is electrically safe. The duty includes ensuring the electrical equipment or electrical installation is electrically safe following installation (this includes testing and examination).

Officers, such as company directors, have a duty to exercise due diligence to ensure that the business or undertaking complies with the ES Act and ES Regulation. This includes taking reasonable steps to ensure that the business or undertaking has and uses appropriate resources and processes to eliminate or minimise electrical risks at the workplace.

Workers must take reasonable care for their own electrical safety and not adversely affect the electrical safety of other persons. Workers must comply with any reasonable instruction and cooperate with any reasonable policy or procedure relating to electrical safety at the workplace. This means that if electrical equipment is provided by the person conducting the business or undertaking, the worker must use it in accordance with the information, instruction and training provided on its use.

Other persons at the workplace, like visitors, must take reasonable care for their own electrical safety and must take reasonable care not to adversely affect other people's electrical safety.

They must comply, so far as they are reasonably able, with reasonable instructions given by the person conducting the business or undertaking to allow that person to comply with the ES Act.

All Duty holders will have additional legal duties under the WHS Act and the WHS Regulation.

1.3 What is required to manage electrical risks?

ES Regulation s11 A person conducting a business or undertaking must manage risks to health and safety associated with electrical risks at the workplace.

WHS Regulation s34-38 In order to manage risk, a duty holder must:

- identify reasonably foreseeable hazards that could give rise to the risk
- eliminate the risk, so far as is reasonably practicable
- if it is not reasonably practicable to eliminate the risk, minimise the risk so far as is reasonably practicable by implementing control measures
- maintain the implemented control measure so that it remains effective
- review, and if necessary revise, all risk control measures so as to maintain, so far as is reasonably practicable, a work environment that is without risks to health and safety.

The hierarchy of risk control is described in Chapter 2.3 of this Code.

This Code includes guidance on how to manage electrical risks in the workplace by following a systematic process that involves:

- identifying hazards
- if necessary, assessing the risks associated with these hazards
- implementing and maintaining risk control measures (e.g. inspecting and testing electrical equipment, using safety switches)
- reviewing risk control measures.

A Flow chart summary of what you need to do is provided at **Appendix B**.

Guidance on the general risk management process is available in the *How to Manage Work Health and Safety Risks Code of Practice 2011.*

1.4 Information, training, instruction and supervision

WHS Act s19 A person conducting a business or undertaking must ensure, so far as is reasonably practicable, the provision of any information, training, instruction or supervision that is necessary to protect all persons from risks to their health and safety arising from work carried out.

WHS Regulation s39 You must ensure that information, training and instruction provided to a worker is suitable and adequate having regard to:

- the nature of the work carried out by the worker
- the nature of the risks associated with the work at the time the information, training or instruction is provided
- the control measures implemented.

You must ensure, so far as is reasonably practicable, that the information, training and instruction is provided in a way that is readily understandable by any person to whom it is provided.

Formal or on-the-job training may be appropriate depending on the circumstances. Examples of training are:

- **induction training**—to ensure new starters or workers new to a job are trained on safe systems of work and other relevant health and safety matters
- **supervisor and management training**—to ensure that safety issues are appropriately managed at the workplace
- **work-specific training**—to ensure that workers carrying out particular work are trained on any electrical and other risks specific to the work, as appropriate
- **ongoing or refresher training**—to ensure that any training on work health and safety matters is repeated as appropriate on a periodic basis
- **emergency procedure training**—to ensure workers know what to do in the event of an emergency, for example procedures to follow if a person receives an electric shock
- **first aid training**—to ensure appropriate procedures are followed for administering first aid, for example proper treatment for electric shock
- **electrical rescue and resuscitation training for safety observers**.

Special needs of workers should be taken into account in deciding the structure, content and delivery of training, including literacy levels, work experience and specific skills required to carry out the work.

2 The risk management process

A person conducting a business or undertaking must manage risks by identifying reasonably foreseeable hazards that could give rise to a risk, eliminating those risks so far as is reasonably practicable, or if that is not possible, minimising those risks by implementing control measures.

Effective risk management involves identifying all of the risks in the workplace, and then carrying out a risk assessment for each, to assess its severity, before deciding its priority for control.

When carrying out a risk assessment, determine the risks that have the greatest potential to cause harm and a greater likelihood of occurring. These risks are treated first, followed by the less serious risks.

Attention should be given to risks that may be easy to fix but may have a low risk (e.g. power leads across the floor). These risks should be fixed promptly. Particular attention should be given to risks that may have very low likelihood of causing harm but may result in major consequences.

The ES Act places duties on a person conducting a business or undertaking and other persons requiring that electrical work and associated equipment be electrically safe (sections 29 to 40); that is, free from electrical risk. Along with complying with any specific requirement of the ES Act or ES Reg, electrical risk can be managed through the risk management process as described below. Specific applications of the risk management process are covered in relevant following parts.

2.1 Identify the hazards

Identifying hazards involves finding all of the tasks, situations and sequences of events that could potentially cause harm.

Hazards from electrical equipment or installations may arise from:

- the design, construction, installation, maintenance and testing of electrical equipment or electrical installations
- design change or modification
- inadequate or inactive electrical protection
- where and how electrical equipment is used. Electrical equipment may be used in environments or under conditions likely to result in damage to the equipment or a reduction in its expected life span. For example, equipment may be at greater risk of damage if treated roughly (dropped or subject to impacts) or used outdoors or in a workshop environment or in dirty, dusty or wet environments
- electrical equipment being used in an area in which the atmosphere presents a risk to health and safety from fire or explosion, for example confined spaces or rooms where gas or combustible dusts may build up
- type of electrical equipment. For example, ‘plug in’ electrical equipment that may be moved around from site to site, including extension leads, are particularly liable to damage
- the age of electrical equipment and electrical installations
- work carried out on or near electrical equipment or electrical installations, including electric overhead lines or underground electric services, for example work carried out in a confined space connected to plant or services; work carried out using cranes, harvesters, irrigation spay machines or excavation plant, whether under, near or over the top of lines.

Exposure to high electromagnetic fields may also present a potential hazard for workers with some medical conditions, for example pace makers. You must inform workers and other persons at the workplace of any potential electromagnetic hazards at the workplace that may affect a medical condition. You must also manage risks to health and safety arising out of electromagnetic hazards, including eliminating the risk so far as is reasonably practicable. If that is not reasonably practicable you must minimise the risk so far as is reasonably practicable.

Potential electrical hazards may be identified in a number of different ways including:

- talking to workers and observing where and how electrical equipment is used
- regularly inspecting and testing electrical equipment and electrical installations as appropriate
- reading product labels and manufacturers’ instruction manuals
- talking to manufacturers, suppliers, industry associations, and electrical safety specialists
- reviewing incident reports
- consulting with electricity entities on locations of overhead power lines or underground cables.

2.2 Assess the risks

Risk assessment involves considering what could happen if someone is exposed to a hazard (consequence) and the likelihood of it happening.

A risk assessment can help determine:

- the severity of an electrical risk
- whether existing control measures are effective
- what action you should take to control an electrical risk
- how urgently the action needs to be taken.

To assess the risk associated with electrical hazards consider:

- What is the potential impact of the hazard?
  - How severe could the electrical hazard be? For example, direct contact causing electrocution, fire or explosion causing serious burns or death.
  - How many people are exposed to the hazard?
- How likely is the hazard to cause harm?
  - Could it happen at any time or would it be a rare event?
  - How frequently are workers exposed to the hazard?

Other factors that may affect consequence and likelihood include:

- the conditions under which the electrical equipment is used, for example wet conditions outdoors or confined spaces
- work practices and procedures, for example isolation, to carry out maintenance
- the capability, skill and experience of relevant workers.

A sample risk assessment is provided at **Appendix C**.

2.3 Control the risks

Once hazards have been identified and the risks assessed, appropriate control measures must be put in place.

The ways of controlling risks are ranked from the highest level of protection and reliability to the lowest. This ranking is known as the *hierarchy of risk control*. You must work through this hierarchy to choose the control that most effectively eliminates or minimises the risk in the circumstances, so far as is reasonably practicable. This may involve a single control measure or a combination of two or more different controls.

You should also check that your chosen control measure does not introduce new hazards.

Elimination

The most effective control measure is to remove the hazard or hazardous work practice. By designing-in or designing-out certain features, hazards may be eliminated.

Substitution

Replacing a hazardous process or material with one that is less hazardous will reduce the hazard, and hence the risk. For example, it may be reasonably practicable to use extra-low voltage electrical equipment such as a battery-operated tool rather than a tool that is plugged into mains electricity.

Isolation

Preventing workers from coming into contact with the source of an electrical hazard will reduce the relevant risks. For example, identifying the relevant switchboard and switching off and locking out the electrical circuit supplying electricity to the equipment before the worker conducts repair or maintenance work on the equipment, such as repairing a water leak on an irrigation pump.

Engineering controls

Use engineering control measures to minimise the risk, for example installing residual current

devices (commonly referred to as safety switches) to reduce the risk of receiving a fatal electric shock.

Administrative controls

Administrative controls involve the use of safe work practices to control the risk, for example establishing exclusion zones, use of permits and warning signs; requiring a visual inspection of electrical equipment by a competent person before use to verify no obvious damage.

Personal protective equipment (PPE)

PPE includes protective eyewear, insulated gloves, hard hats, aprons and breathing protection. Most forms of PPE are not relevant to minimising electrical risks in workplaces, except in relation to energised electrical work.

Administrative controls and PPE do nothing to change the hazard itself. They rely on people behaving as expected and require a high level of supervision. Exclusive reliance on administrative controls and PPE must only occur where other measures are not reasonably practicable or as an interim control while the preferred control measure is being implemented.

2.4 Review the control measures

The controls that are put in place to ensure electrical safety must be reviewed regularly to make sure they work effectively.

WHS Regulation s38 A person conducting a business or undertaking must review and as necessary revise a control measure in the following circumstances:

- when the control measure does not control the risk it was implemented to control so far as is reasonably practicable
- before a change at the workplace that is likely to give rise to a new or different risk to health or safety that the measure may not effectively control
- if a new relevant hazard or risk is identified
- if the results of consultation indicate that a review is necessary
- if a health and safety representative requests a review.

The following questions will help you evaluate how well you are currently managing electrical risks in your workplace:

- Do you talk to your workers about electrical safety?
- Do any relevant new work methods or equipment have the potential to make work safer in your workplace?
- Are procedures for identifying electrical hazards in the workplace effective?
- Do you audit procedures and work practices to verify safety procedures are followed?
- Do you encourage your workers to report electrical hazards?
- Do you regularly inspect and maintain your electrical equipment to identify safety problems?
- Do you identify, for example mark on maps or with flags on wires, the location of any overhead power lines, and do you explain to your staff and contractors and their workers the locations of overhead power lines on or near the property or where large vehicles (such as harvesters) may operate or travel?
- Do you ensure all staff, vehicles, or the location of stored equipment maintains exclusion zones to overhead powerlines?
- Do you fix or rectify identified electrical hazards in a timely manner?

3 Specific hazards and risk control

There are a number of things you should do to manage the risks to health and safety associated with electrical risks at the workplace including the following:

- Ensuring power circuits are protected by the appropriate rated fuse or circuit breaker to prevent overloading.
- If a circuit keeps overloading, don't increase the fuse rating as this creates a fire risk due to overheating. Instead ensure the circuit is not re-energised until the reason for the operation has been determined by a competent person.
- Ensuring that leads, including cord extension sets and flexible cables, are arranged so they will not be damaged. For example, avoid running leads across the floor or ground, through doorways and over sharp edges, and use lead stands or insulated cable hangers to keep leads off the ground. In many heavy industries, cable protection ramps are used to protect cables.
- Not using leads and tools in damp or wet conditions unless they are designed for those conditions.
- Ensuring circuits where portable electrical equipment can be connected are protected by appropriate safety switches (as required by the ES Regulation) that are properly tested and maintained.
- Consider installing safety switches on all electrical circuits, not just power or light circuits, including fixed equipment unless that equipment cannot operate with a safety switch.
- If safety switches, circuit breakers or other over current protective devices including fuses are triggered into operation, ensuring circuits are not re-energised until the reason for the operation has been determined by a competent person.
- Ensuring safety switches are effective by regular testing.
- Identifying locations of all overhead powerlines and underground cables and ensuring exclusion zones are maintained.

3.1 Unsafe electrical equipment and electrical installations at the workplace

ES Regulation s101 A person conducting a business or undertaking that has management or control of electrical equipment must ensure that any unsafe electrical equipment at the workplace is disconnected (or isolated) from its electricity supply and, once disconnected, is not reconnected until it is repaired or tested and found to be safe or is replaced or permanently removed from use.

Electrical equipment is unsafe if there are reasonable grounds for believing it to be unsafe.

You should implement a safe system of work to deal with potentially unsafe electrical equipment at the workplace. This could include:

- training workers to be competent in, and requiring them to, to undertake, checking of the physical condition of any electrical equipment, including the lead and plug connections, prior to commencing use
- taking the electrical equipment out of service if in doubt as to safety, including at any time during use
- putting reporting arrangements in place to ensure, so far as is reasonably practicable, that supervisors or line managers are advised if a worker takes electrical equipment out of service for safety reasons.

Unsafe electrical equipment must be disconnected or isolated from its electricity supply. It must not be reconnected unless it is repaired by a competent person or tests by a competent person have confirmed it is safe to use (for definition of 'competent person' see **Appendix A**). Alternatively, it could be replaced or permanently removed from use.

Unsafe electrical equipment should be labelled indicating it is unsafe and must not be used. This is to prevent inadvertent use before the electrical equipment can be tested, repaired or replaced.

3.2 Maintenance regimes for electrical equipment used with stated electrical risk factors

A regular maintenance regime will assist a person conducting a business or undertaking to ensure electrical equipment is electrically safe.

Maintenance of equipment includes maintaining safe methods of use of the equipment within the manufacturer's safe design parameters.

Maintenance of electrical equipment should be undertaken by a competent person, and where the work includes electrical work it must pe performed by a worker licensed to undertake that work.

The maintenance regime should be clearly documented and be available for inspection at the workplace. Records of maintenance and service should be kept at your workplace for inspection and reference.

4 Risk control – Initial and annual visual examination

4.1 How do you tell if electrical equipment is safe to use?

Initially, visually examine electrical equipment to see whether the power points, light fittings, switchboards, wiring and other electrical equipment appear to be undamaged and in operational condition. Pay particular attention to the electrical equipment discussed in the following pages to see if there is any damage, or if the equipment has other readily apparent problems.

If any problems are found, or it is suspected that something is not electrically safe, a licensed electrical contractor or an employee who is a licensed electrical worker are the only people permitted to rectify the problems involving electrical work.

This visual examination should be conducted at least once every 12 months for fixed equipment and before each use for portable plug in equipment.

Examinations of fixed equipment my need to be more frequent depending on environmental conditions, for example equipment in locations with high amounts of dust or other contaminants, equipment subject to extreme weather conditions.

4.1.1 Switchboards

Switchboards should be checked to ensure that all switchboard equipment such as fuses, safety switches and circuit breakers are clearly marked to indicate the equipment they control. It should be clear from switchboard markings which circuit breaker or fuse controls particular equipment.

It is important that switchboard markings are correct so in an emergency, electrical equipment can be quickly isolated.

If the fuses, safety switches or circuit breakers and their related electrical equipment or circuits cannot be identified, a licensed electrical person should be called in to mark the switchboard correctly.

There should be no broken parts of switchboards or switchboard equipment that allow access to *live parts*.

This means that the live parts within the fuse can be touched, and therefore there is a risk of electric shock. The fuse wedge can be replaced without a fuse cartridge or element in it, to make it safer.

Make sure live parts are not touched when performing this task. Take these precautions: turn off all main switches and wear dry, rubber-soled shoes before replacing the fuse wedge.

For example, Figure 1 shows a group of fuses on a section of a switchboard. One of the fuse wedges (the removable part) has been taken out and not replaced.

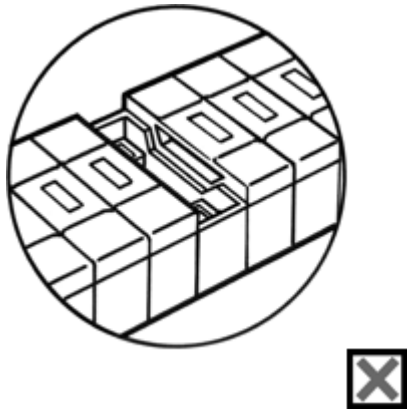


Figure 1

Figure 2 shows a switchboard with a circuit breaker removed, leaving a hole where a person's fingers could touch live and dangerous internal parts of the switchboard. Only a licensed electrical person should repair this. Ensure no contact is made with live parts when carrying out this visual inspection.

Ensure all live parts in the switchboard are suitably isolated before any work is conducted on, or in, a switchboard.

Be aware older switchboards may contain asbestos – appropriate control measures must be applied where asbestos is identified. For more information see the WHS Regulation, Chapter 8 and the *How to manage and control asbestos in the workplace Code of Practice 2011*.

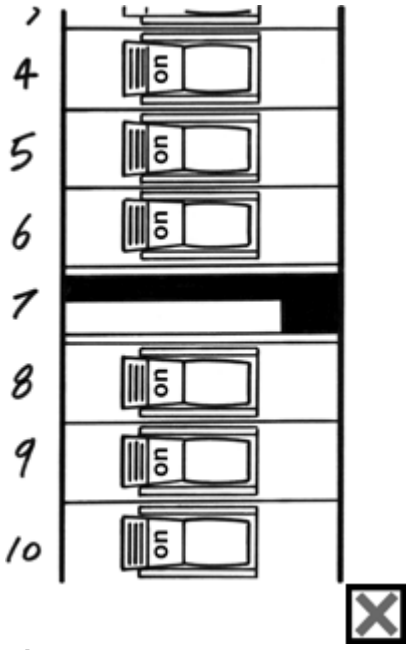


Figure 2

4.1.2 Electrical cables and conduits

Electrical cables and conduits should be checked to see if they are secure and not damaged or exposed to damage. Cables can be exposed to risk of damage, for example, by being run over by a vehicle, or by exposure to other mechanical damage such as heat and excessive vibration (see Figure 3).

Figure 3 shows a conduit which has become detached from its fixings, leaving it free to move.

This needs to be repaired by a licensed electrical person.

Figure 3

4.1.3 Overhead power lines

You should ensure that overhead power lines have not been made unsafe, for example, by buildings or equipment having been located under or near them.

For example, in Figure 4 a silo with a ladder and loading platform has been placed adjacent to an overhead line. This means the safe clearance the line achieved when constructed has changed, and the line now presents an electrical safety risk.

You should also consider methods to identify all overhead powerlines on your property and methods to inform all your workers or contractors and their workers you engage of the powerline locations. This should include ensuring any moving plant is identified before use if it or workers using the plant, may be able to contact the powerlines, such as trucks, harvesters (with harvest arms set in operating and transporting positions), irrigation spray arms and elevated work platforms.

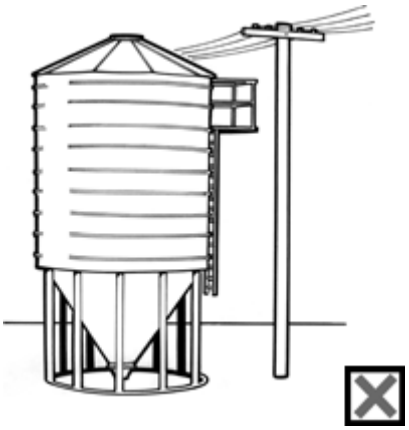


Figure 4

4.1.4 Power poles

Poles which support overhead lines should be in a safe condition. Poles should be checked for deterioration, for example, from rot or white ants, at least every five years. Pole inspections must be carried out by a person competent in pole inspections.

4.1.5 Electrical accessories

Electrical accessories must not be cracked, broken, or otherwise damaged, and should not have malfunctioning parts such as faulty switches (see Figure 5). Damaged or otherwise unsafe electrical equipment needs to be repaired by a licensed electrical worker.

In Figure 5, you will notice that the plate of the power point is cracked and needs to be replaced by a licensed electrical person. An inspection of the equipment being plugged in will also show the cord is damaged. Therefore, this equipment must be removed form service, tagged as unsafe and repaired by a licensed electrical worker prior to use.

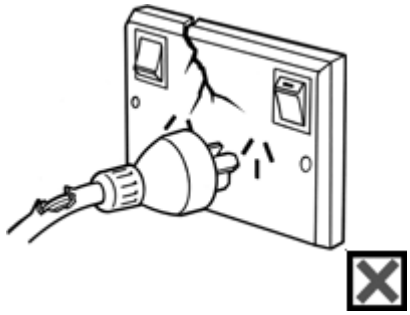


Figure 5

4.1.6 Other electrical equipment

Other electrical equipment connected to the electrical installation for use should be checked to ensure that:

- there are no broken or damaged parts of the equipment, including controls, cabinets or casings
- safety related parts, including guards, warning lights or gauges, are operating as designed
- light fittings do not have broken lamps or bulbs where people can touch live parts (filament of the lamp or bulb)
- the equipment is not exposed to environmental conditions for which it was not designed, e.g. electrical equipment such as water pressure systems that plug into a socket outlet may appear to be designed for exposure to the weather, but some are not; the manufacturer's or agent's advice should be checked if in doubt.

If electrical equipment is electrically unsafe, it must only be repaired or replaced by a licensed electrical person, or if it is plug-in equipment, it should be removed from service.

Figure 6 shows that the terminal connection box of the motor is partially detached and may expose live terminals.

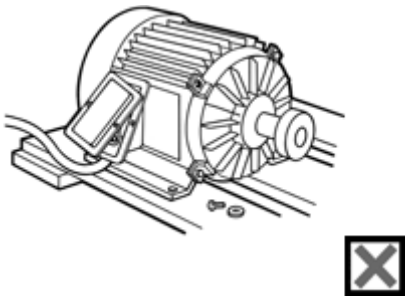


Figure 6

4.2 Visual examination of handheld electrical equipment

A person conducting a business or undertaking must ensure that handheld electrical equipment, is visually inspected for obvious defects or damage before it is connected to the electricity supply.

Ensure that all parts of the equipment that are likely to be touched by the user have been examined for:

- cuts or other damage to the flexible lead that expose the insulation of the inner cores or the conductors (e.g. running the flexible cord through the hand before it is connected to the supply of electricity can help detect damage)
- melted or burnt areas of the plug, flexible lead or equipment
- security and safety of covers, guards and controls such as power points, switches and the like
- cracks or holes in the equipment that may expose live parts when used

- interlock switches or devices are correctly operating
- all mechanical guards are in place
- correct rated supply plug is attached (for example a 10Amp plug on equipment rated 10Amp and a 15Amp plug on equipment rated 15Amp)
- obstruction to ventilation inlets and exhausts.

The illustrations below show examples of equipment that a visual examination has found to be defective.

Figure 7 shows a lead that has had heavy objects dropped on it, causing broken and deformed insulation.

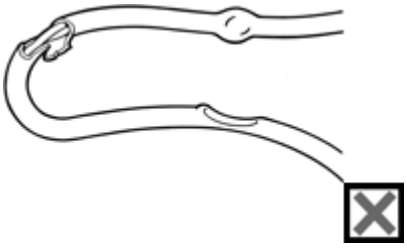


Figure 7

Figure 8 shows a drill that has a broken air vent. A person could inadvertently touch internal live parts of the drill.

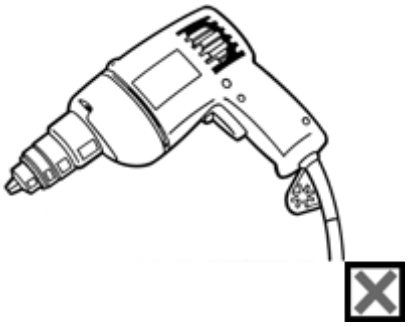


Figure 8

Figure 9 shows an extension socket that is cracked and split. This figure also shows an older extension socket that does not have a shroud around the aperture face. PCBU should consider a maintenance program that's includes replacing all such older extension sockets over time.

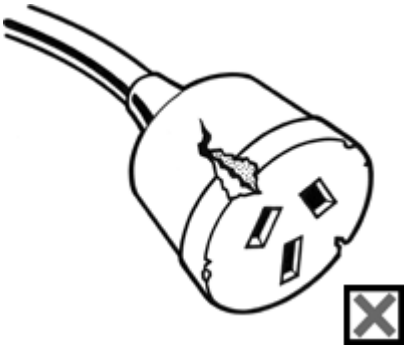


Figure 9

Figure 10 shows a plug that has signs of heat damage. Further use could cause a fire.

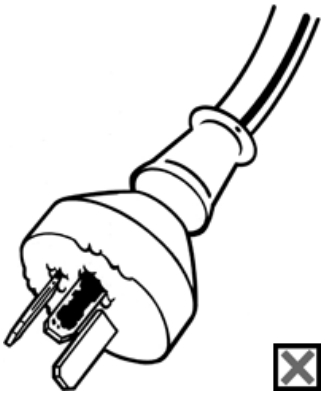


Figure 10

4.2.1 What do you do when unsafe equipment is suspected?

If the handheld or otherwise personally carried electrical equipment is identified as defective, damaged or possibly electrically unsafe, the equipment should be:

- immediately withdrawn from service
- labeled in a manner to warn against further use until examined by a licensed electrical person
- either:
  - repaired by a licensed electrical worker
  - disposed of or destroyed so that it cannot be connected to an electricity supply, (e.g. break off the plug pins).

In the case of fixed electrical equipment, appropriate action should be taken to ensure personal safety until a repair by a licensed electrical worker can be made. For example, if electrical equipment is damaged and live parts are exposed, there should be a procedure in place to ensure that:

- the equipment is isolated at the supply point, for example the isolation switch to the equipment is locked in the off position or the circuit breaker at the switchboard is tagged in the off position
- persons are kept clear of exposed live parts
- a licensed electrical worker attends to make the equipment safe.

5 Risk control–Stated electrical risk factors

Almost all rural workplaces will have stated electrical risk factors in one or more locations. For example, if you use electrical equipment in a wet environment, or if you impose harsh wear on electrical equipment in your workplace, a stated electrical risk factor will exist.

Under section 120(5) of the ES Regulation, stated electrical risk factor means any of the following:

- use of plug-in electrical equipment in an unroofed area or wet area (e.g. a hose down area);
- use of personally supported electrical equipment* if the electricity supply cord is subject to flexing while the equipment is being used
- use of plug-in electrical equipment that is exposed to environmental factors that subject the equipment to abnormal wear or deterioration.

Examples of environmental factors that subject equipment to abnormal wear or deterioration:

- corrosive or other damaging dusts (e.g. metal dust)
- corrosive chemicals in the air.

* Personally supported electrical equipment includes handheld, or carried, electrical equipment, for example, a back pack type vacuum cleaner.

5.1 What must you do where there are stated electrical risk factors?

Under section 120 of the ES Regulation, if proposed work involves a stated electrical risk factor, risk control measures (as outlined in Chapter 4 of this Code) must be implemented to prevent the electrical risk from the stated electrical risk factor.

Under section 120 of the ES Regulation, if specified electrical equipment is used by the person conducting a business or undertaking for work that involves a stated electrical risk factor, the specified electrical equipment must:

- be connected to a type 1 or type 2 safety switch
- be inspected and tested at least annually by a competent person and comply with AS/NZS 3760 *In-service safety inspection and testing of electrical equipment* when tested.

You should ensure that the circuit supplying electric light fittings that are accessible within arm's reach is protected by a safety switch.

If you have a safety switch installed for socket outlets, you should ensure that the installer provides a report of the post-installation test carried out on the safety switch. The report should indicate:

- the magnitude of the test current used to verify operation
- the time taken for the safety switch to disconnect the circuit when the test current was applied.[1]

If you do not have a safety switch installed for socket outlets, you can provide safety switch protection of equipment by connecting it to a portable safety switch.

5.2 Safety switches

Safety switches, also known as residual current devices (RCDs), are devices that cut off the electricity supply when there is a very small earth fault on an electrical circuit. Since earth faults are the most common type of fault involved in electric shocks, safety switches are a good way of reducing the risk of death or injury from electric shock. Safety switches have other advantages, for example, they detect an earth fault long before a normal fuse or circuit breaker will detect the same fault, and this can sometimes save the equipment from more serious damage. Safety switches must comply with AS/NZS 3760.

5.2.1 Does your work area have a safety switch or switches?

Safety switches are generally located on the switchboard of an electrical installation, although they can be located elsewhere. The most common other location for an installed safety switch is at a power point which has the device built in to it. There are portable safety switches which will provide protection for plug-in electrical equipment.

Figure 11 below gives a representation of where safety switches are located in a typical rural industry installation. This installation has three switchboards. In this installation the switchboards have safety switches to protect power points and other electrical equipment. However, it is important to note that the switchboards themselves are not usually safety switch protected.

[1] Note for licensed electrical persons:

- For type 1 safety switches, the test current should not exceed 10mA.
- For type 2 safety switches, the test current should not exceed 30mA.

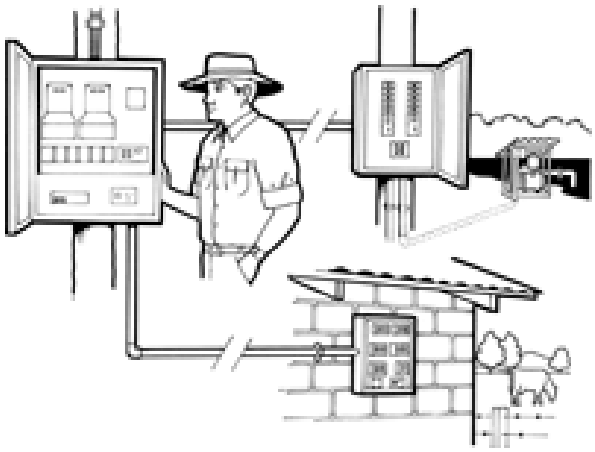


Figure 11

Figure 12, shows three common types of switchboard mounted safety switches, mounted together.

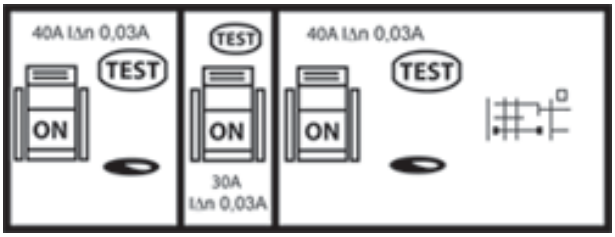


Figure 12

A typical safety switch incorporated in a power point is pictured at Figure 13.

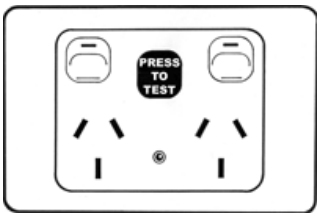


Figure 13

Figure 14 below shows three different types of portable safety switch. You can use portable safety switches to meet the regulatory requirement where there are stated electrical risk factors.

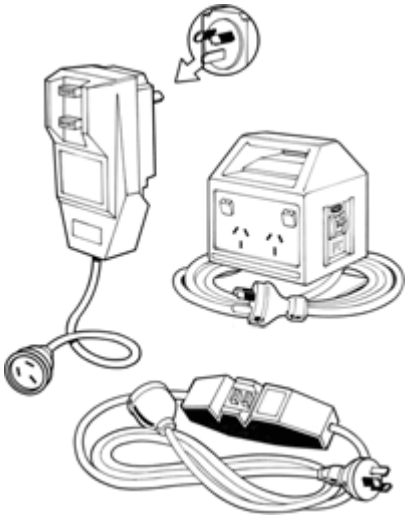


Figure 14

Your electrical installation will have at least one switchboard. It may have more than one. Very large installations can have many switchboards located throughout the building or buildings, and there may be switchboards located out of doors and not attached to a building. You should check all switchboards and power points to determine whether safety switches are fitted.

The devices you will find on switchboards can include:

- fuses
- circuit breakers
- safety switches
- combination devices that are both a circuit breaker and a safety switch.

Not all of these devices will be on every switchboard. Sometimes a switchboard may consist only of a number of circuit breakers or a number of fuses. Some switchboards will have a device of all the types mentioned above, and may have other electrical devices, including power points.

The purpose of fuses and circuit breakers is to protect circuit wiring from damage in the event of a fault, and to prevent exposed conductive parts of electrical equipment from becoming live long enough, or to a high enough voltage, to cause a person a serious shock in the event of an electrical fault.

Safety switches often look similar to ordinary circuit breakers. The main external feature that a safety switch has, and most circuit breakers do not is a test button (larger circuit breakers of 150 amp capacity or more can have test buttons).

5.2.2 How to find out which equipment is protected by a safety switch

Ideally, each safety switch should have marked on or beside it the circuits or equipment it protects. Often however, the marking will not be specific enough to identify every item of equipment protected.

To identify the electrical equipment protected by a safety switch, carry out the following procedure:

1. Turn the safety switch off: you can do this by pressing the test button or by operating the on/off toggle or switch.
   Please note: If pressing the test button does not cause the switch to flick to the off position, the safety switch is faulty and requires checking or replacement by a licensed electrical person.
2. Check which equipment or circuits are not functioning, by:
   - turning on lights
   - turning on fixed equipment using safe procedures
   - checking power points using a convenient appliance such as a radio.
3. List items not functioning.
4. Turn the safety switch back on.
5. Check that listed items now function.

Listed items which function after the safety switch is turned on are protected by the safety switch. Items which continue to function when the safety switch is turned off are not protected by that safety switch.

This procedure needs to be conducted for each safety switch and will result in a list of all safety switch protected equipment. All other equipment will not be safety switch protected.

If you have a safety switch that is a portable type, you should ensure it is tested before every use.

5.2.3 How do you test your safety switch and how often should you test it?

You can test that your safety switch is operating correctly by a quick push and release of the 'test' button on the unit. The safety switch will automatically trip 'off' (the toggle will flip to the off position). You can confirm it is operating correctly by checking the equipment connected to that circuit have stopped operating. If the safety switch does not trip off and stop electricity supply to the equipment, you must have the unit checked or replaced by a licensed electrical worker as soon as possible, and you should prevent others from using equipment that would otherwise be protected by it, by leaving it turned off, unplugging handheld items and affixing a warning tag.

There is no prescribed time limit for testing of your safety switch by the test button, but it is recommended that you test it in accordance with the manufacturer's instructions. Where manufacturer's instructions are not available, you should test the safety switch by the test button every three months.

5.2.4 How do you ensure that your electrical installation remains electrically safe?

Under section 30 of the ES Act, you have a duty to ensure that your business or undertaking is conducted in a way that is electrically safe. The duty includes ensuring that all electrical equipment used in the conduct of your business or undertaking is electrically safe. A way of achieving this is to have an electrical contractor inspect the electrical equipment regularly or when you have them attending for other maintenance or repair work. An electrical contractor inspection at least every ten years could assist in ensuring a safe installation.

6 Risk control–Electric welding work

If welding is an activity conducted at your workplace, you must do what the ES Regulation says for all work areas. Under section 120(1)(a) of the ES Regulation, a visual inspection of the electric welding equipment must be carried out prior to use, and any cord extension sets used should comply with the requirements of this Code.

However, welding presents an extra set of risks.

When a person is welding, they may make contact with the electrode of the welder and receive a shock. The severity of the shock depends on several factors, including the amount of current flowing through the body, the path of the current through the body, and the length of time the person is exposed to the current.

To reduce these risks, all electrode holders should be fully insulated and approved to an acceptable standard. Welding electrode holders or electrode tongs should be made of glass fibre-reinforced plastic or other insulated materials. Electrode holders should be maintained to ensure high conductivity between electrode and holder.

There should be a safe system of work in place for the performance of electric welding work. The safe system of work should address the electrical safety risks of electric welding. Risk control measures should include ways of eliminating or minimising all risks, including electric shock, burns and inhalation of toxic gases.

6.1 Regulatory requirements for rural industry work

Under section 120(1)(e) of the ES Regulation, a person conducting a business or undertaking must ensure that risk control measures are implemented for the risk of electric shock or burns from electric welding work performed in the person’s business or undertaking, including the wearing of protective clothing, gloves, footwear and eye protection.

In addition to this, other risk control measures should be implemented as necessary to prevent shock and burns.

In high risk situations, such as welding in an enclosed space with conductive surfaces, a safe system of work would need either:

- an electrode disconnection device (this device disconnects the electrode holder while the electrode is being changed)
- a voltage reduction unit (this device reduces the open circuit voltage of a welder to a safe value)
- an additional person to oversee the work and disconnect the supply of power at times when the electrode needs to be changed.

Welding equipment suppliers will be able to assist with information about safety equipment.

For more detailed information please refer to the following:

- Welding Processes Code of Practice 2013
- Weld Australia website at www.wtia.com.au.

7 Risk control–Hazardous areas

7.1 Hazardous areas: where they exist

An area is considered hazardous if there is an explosive atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment. An explosive atmosphere is created when there is enough flammable substance, such as petrol vapor or grain dust, mixed with the air in a place.

Some work locations may not have been a hazardous area when the original work was being performed, however change of work practices or use of other materials in the area may have changed it into a hazardous area.

Typical examples of hazardous areas include:

- petrol dispensing or decanting areas
- liquefied petroleum gas (LPG) storage and decanting areas
- areas in or adjacent to gas storage facilities
- ripening rooms
- grain silos (flammable dusts)
- areas where flammable products are stored, used, or decanted.

7.2 Hazardous area precautions

The best and simplest way of making sure a hazardous area is electrically safe is not to have any electrical equipment in it.

Never run an extension lead to a hazardous area to use plug-in electrical equipment. Even extra low voltage equipment such as battery drills should not be used in a hazardous area, because they can create electrical sparks and arcs which may initiate an explosion.

If it is essential to have electrical equipment in a hazardous area, you must ensure that:

- the hazardous area is classified by an expert person, establishing the type of hazardous atmosphere and its risk level, in accordance with recognised standards
- a licensed electrical person ensures that the electrical installation and equipment are suitable for the classification
- a licensed electrical person ensures that the electrical installation is audited by an accredited auditor before it is connected to supply.

Appendix A - Dictionary

Arm's reach means 2.5m vertically upwards, and 1.25m sideways or downwards, from any point on a surface where persons usually stand or move about.

Cathodic protection system means a system by which a structure in contact with ground or water is protected from electrolytic corrosion by a direct electric current flowing between the structure and an electrical conductor through the ground or water.

Circuit breaker means a switch suitable for opening a circuit automatically, as a result of predetermined conditions, such as those of over-current or under-voltage, or by some form of external control. Circuit breakers are most often mounted on switchboards and are used to protect the circuits that are supplied from a switchboard. Circuit breakers are not the same as safety switches.

Class 1 equipment means equipment in which protection against electric shock does not rely on basic insulation only. It includes an additional safety precaution in that accessible conductive parts are connected to the protective earthing conductor in the fixed wiring of the electrical installation in such a way that accessible parts cannot become live in the event of a failure of the basic insulation.

Notes:

- Class 1 equipment may have parts with double insulation or parts operating at SELV (safety extra low voltage).
- For equipment intended for use with a flexible cord or cable, this provision includes a protective earthing conductor as part of the flexible cord or cable.

Competent person means a person who has acquired, through training, qualifications, experience or a combination of these, the knowledge and skills to carry out the task.

Note: for the performance of electrical work—the person must be licensed or otherwise authorised under the ES Act to perform the electrical work.

Conductive means able to transmit electricity. Examples of conductive objects are any metallic substance, concrete, water or wet or damp objects.

Cord extension set means an assembly of:

- a three-pin *plug* intended for connection to a socket outlet
- a sheathed flexible cord
- a *cord extension socket*.

A cord extension set is commonly referred to as an extension lead.

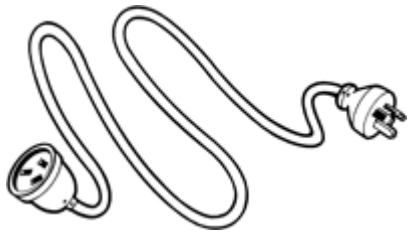


Figure 16: A cord extension set

Cord extension socket (referred to as a 'socket') means a device arranged for attachment to a flexible cord and having contacts whereby a detachable connection can be made with pins of a plug.

Figure 17: A cord extension socket

Earthed situation means a place where a person can touch electrical equipment while still in contact with the earth or metal or other conductive thing touching the earth. All parts of a bathroom, laundry, lavatory, toilet or kitchen are earthed situations.

An example of an earthed situation is an external concrete area from which you can touch a light fitting.

Electrical equipment (see section 14 of the ES Act) means any apparatus, appliance, cable, conductor, fitting, insulator, material, meter or wire:

- used for controlling, generating, supplying, transforming or transmitting electricity at a voltage greater than extra low voltage; or
- operated by electricity at a voltage greater than extra low voltage; or
- is, or is part of, a cathodic protection system; or
- is prescribed electrical equipment.

However, electrical equipment does not include any apparatus, appliance, cable, conductor, fitting, insulator, material, meter or wire forming part of a vehicle if:
- it forms part of a unit of the vehicle that provides propulsion for the vehicle
- its source of electricity is a unit of the vehicle that provides propulsion to the vehicle.

Examples of things that are not electrical equipment:
- the headlights of a motor vehicle;
- ignition spark plugs of a motor vehicle; and
- the interior lighting system of a vehicle, if powered from a battery charged by the engine that drives the vehicle or by the vehicle's movement.

Examples of things that are not prevented from being electrical equipment:
- interior lighting or a socket outlet in a caravan, if the lighting or outlet is operated by a low voltage generating set or connected to low voltage supply; and
- a refrigeration unit in a food delivery vehicle operating at low voltage from a source separate from the propulsion unit for the vehicle.

However, prescribed electrical equipment is electrical equipment even if it forms part of a vehicle

Electrical installation (see section 15 of the ES Act) means a group of items of *electrical equipment*.

However, a group of items of *electrical equipment* is an electrical installation only if:
- the items are permanently electrically connected together; and
- can be supplied with electricity from —
  - the works of an electricity entity; or

- a generating source; or
- a battery or other storage technology; and

- the items do not include items that are works of an electricity entity.

Also, an electrical installation is a group of items of electrical equipment that —

- are permanently electrically connected together; and
- are used to generate electricity at a voltage greater than extra low voltage; and
- do not include items that are works of an electricity entity.

Notes:

- An item of *electrical equipment* can be part of more than one electrical installation.
- An item of *electrical equipment* connected to electricity by a plug and socket outlet is not permanently electrically connected.

Examples of an electrical installation:

- the switchboard, wiring, lighting, motors, controls and other *electrical equipment* permanently connected for an irrigation plant
- the switchboard, wiring, lighting, socket outlets and other *electrical equipment* permanently connected for a dairy.

Electrical risk (see section 10 of the ES Act) means:

- in relation to a person, the risk to the person of death, shock or injury caused directly by electricity or originating from electricity
- in relation to property, the risk to the property of:
  - damage caused by a cathodic protection system
  - loss or damage caused directly by, or originating from, electricity.

Electrically safe (see section 10(2) of the ES Act) means:

- for a person or property, that the person or property is free from *electrical risk*
- for *electrical equipment* or an *electrical installation*, that all persons and property are free from *electrical risk* from the equipment or installation
- for the way *electrical equipment*, an *electrical installation* or the works of an electricity entity are operated or used, that all persons and property are free from *electrical risk* from the operation or use of the equipment, installation or works
- for the way electrical work is performed, that all persons are free from *electrical risk* from the performance of the work
- for the way a business or undertaking is conducted, that all persons are free from *electrical risk* from the conduct of the business or undertaking
- for the way *electrical equipment* or an *electrical installation* is installed or repaired, that all persons are free from *electrical risk* from the installing or repairing of the equipment or installation.

Electrical safety (section 10(2) of the ES Act), for a person or property, means the person or property is electrically safe.

Electrical safety examination means a procedure performed by a competent person which includes:

- an inspection to identify visually identifiable defects that cause the equipment to be electrically unsafe
- an operational test of *safety switches*
- an indicative earth continuity test of parts within *arm's reach* that are required to be earthed.

Exposed live part means a part of the electrical installation or electrical equipment which is exposed, and that, if touched could cause an electric shock.

Fixed electrical equipment means electrical equipment that is a permanent part of the workplace, such as poles, switchboards, wiring, power points, and other equipment that cannot be unplugged. For example, an electrical motor driving a refrigeration plant in the milk room of a

dairy would be fixed electrical equipment.

Free from electrical risk (see section 10(4) of the Act), for a person or property means that the *electrical risk* to the person or property has been eliminated, so far as is reasonably practicable; or if it is not reasonably practicable to eliminate electrical risk to the person or property, the risk has been minimised so far as is reasonably practicable.

Hazard means a situation or thing that has the potential to harm a person. Hazards at work may include: noisy machinery, a moving forklift, chemicals, electricity, working at heights, a repetitive job, bullying and violence at the workplace.

Hazardous area means an area where an explosive atmosphere is present or may be present.

Inspected and tested in relation to specified electrical equipment means that the equipment is tested and inspected by a *competent person*, and if the competent person decides the equipment is safe to use, a durable tag has been attached to the equipment that shows the day by which the equipment must be re-inspected and retested.

Licensed electrical person means a licensed electrical worker or licensed electrical contractor.

Live part means a conductor or parts of electrical equipment that can become electrically energised in normal use and which are dangerous to touch. *Live parts* are normally enclosed or otherwise protected by the design of *electrical equipment* so that they cannot be touched by persons.

Plug means an accessory having pins designed to engage with the contacts of a socket-outlet and incorporating means for the electrical connection and mechanical retention of flexible cables or cords. Figure 18 shows a plug with insulated live pins for insertion into socket outlets complying to AS/NZS 3112 (Australian plug and socket outlet standard)

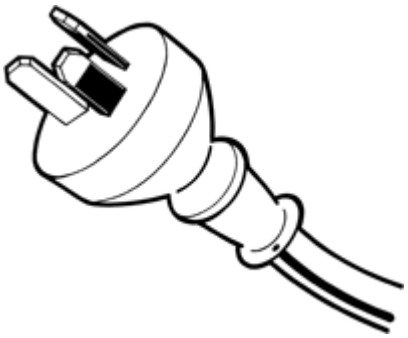


Figure 18: A plug

Risk is the possibility that harm (death, injury or illness) might occur when exposed to a hazard.

For example, if the risk is electricity, there the likelihood that a worker might be electrocuted because of the exposure to electrical live parts.

The degree of risk will depend on the amount of exposure to the risk. With regard to electricity, this would relate to aspects of the electricity i.e. voltage, frequency of exposure, and degree of risk control measures in place.

Risk control means taking action to eliminate health and safety risks so far as is reasonably practicable, and if that is not possible, minimising the risks so far as is reasonably practicable. Eliminating a hazard will also eliminate any risks associated with that hazard.

Safety switch, or residual current device (RCD), means a device intended to isolate supply to protected circuits, socket outlets, or *electrical equipment* in the event of a current flow to earth which exceeds a predetermined value. Safety switches that have a rated load current not exceeding 125 A for devices intended for connection to fixed wiring or 20 A for other devices and are used to prevent serious injury to persons must have Australian certification and be marked with the Regulatory Compliance Mark ⟶  (RCM) and a tripping current not exceeding 30 mA, and a tripping time not exceeding 300 mS.

Specified electrical equipment (section 97 of the ES Regulation) for rural industry work means:

- a *cord extension set* with a current rating of not more than 20 amps; or
- a portable outlet device with a current rating of not more than 20 amps; or
- *electrical equipment* other than a portable safety switch that:
  - has a current rating of not more than 20 amps
  - is connected by a flexible cord and *plug* to low voltage supply.

Stated electrical risk factor (section 120 of the ES Regulation) means any of the following:

- use of plug-in *electrical equipment* in an unroofed area or wet area (e.g. a hose down area)
- use of personally supported *electrical equipment* if the electricity supply cord is subject to flexing while the equipment is being used
- use of plug-in *electrical equipment* that is exposed to environmental factors that subject the equipment to abnormal wear or deterioration.

Example of environmental factors that subject equipment to abnormal wear or deterioration:

- corrosive or other damaging dusts, for example, metal dust
- corrosive chemicals in the air.

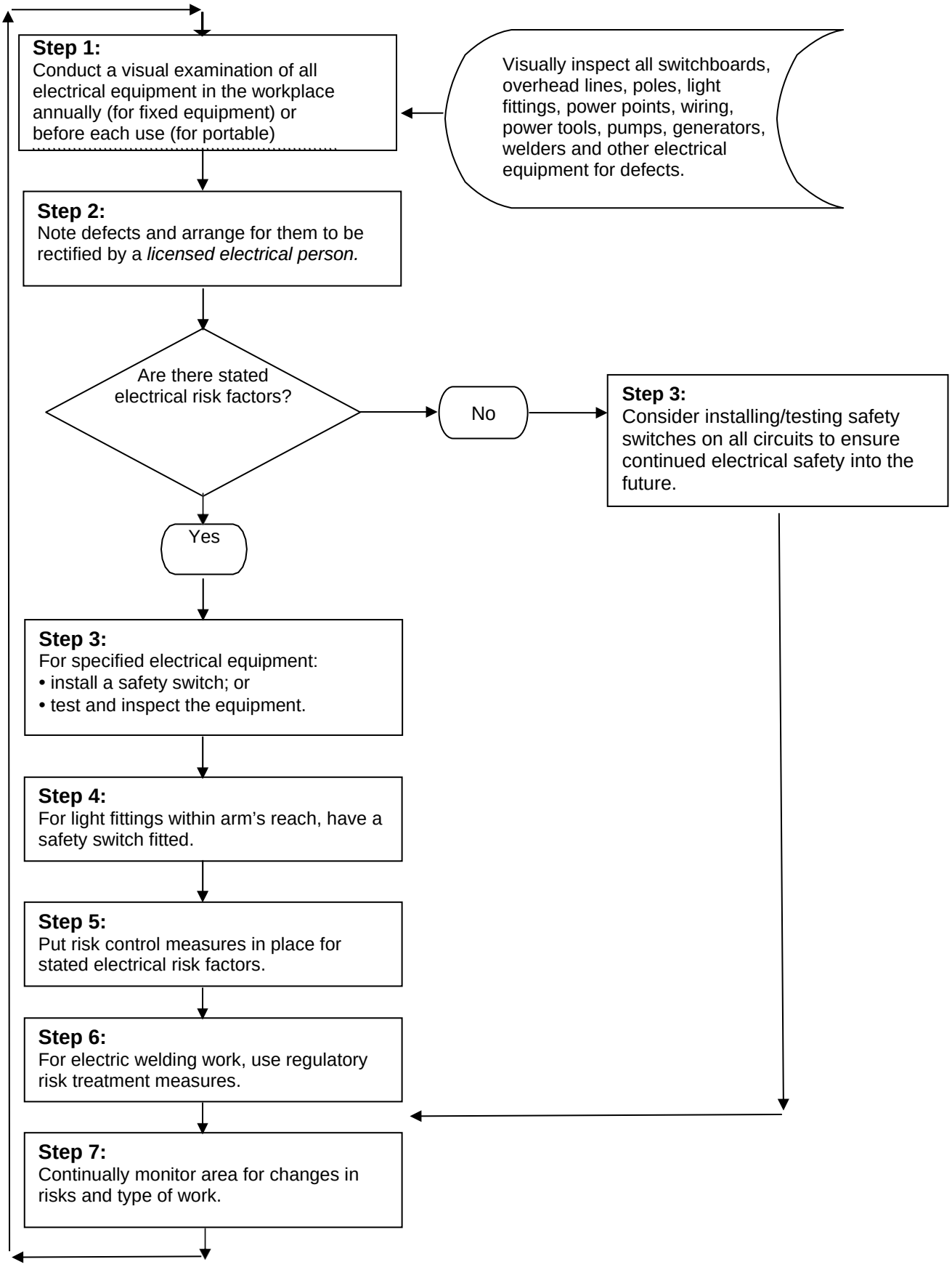
Supervision means the overseeing of workers, including trainees and apprentices, to ensure risks to people and property are eliminated or at least minimised. While a supervisor may perform audits, auditing should not be seen as interchangeable with supervision. Supervision of electrical work includes:

- health and safety matters
- statutory compliance e.g. monitoring the work an apprentice or restricted electrical worker is permitted to perform
- technical aspects e.g. compliance with AS/NZS 3000
- implementation of a safe work method statement prepared for the work.

Voltage means differences of potential normally existing between conductors and between conductors and earth as follows:

- ***Extra low voltage*** means voltage that does not exceed 50 volts root mean square (RMS) alternating current (50 V AC RMS) or 120 volts ripple-free direct current (120 V ripple-free DC).
- ***Low voltage*** means voltage that exceeds extra-low voltage and does not exceed 1000 volts RMS alternating current (1000 V AC RMS) or 1500 volts ripple-free direct current (1500 V ripple-free DC).
- ***High voltage*** means voltage that exceeds low voltage.

Appendix B–Flow chart summary of what you need to do to manage electrical risks



Appendix C–Sample risk assessment

This risk assessment form gives an example of a dairy farm installation and equipment. The risks have been identified and rated. Risk control measures have been selected to manage risks. This risk assessment needs to be reviewed regularly.

Note: the ES Regulation requires certain measures for specified electrical equipment.

Sample risk assessment

Electrical equipment	Circumstance	Risk	Risk level	Risk control measures
Main switchboard	If removed fuses have exposed live parts.	Electric shock and explosion	Low	• Regular visual check. • Replace fuses by suitably Trained person.
Workshop shed lighting is within arm's reach	If internal parts of light fittings are accessed.	Electric shock	Low	• Regular visual check. • Have safety switch installed for lights. • Electrical maintenance work only by licensed electrical persons.
Poles, cross arms and overhead lines	If damaged by vehicle or other incident.	Electric shock	Medium	• Protect poles from vehicular damage by barricading or by administrative controls.
Poles, cross arms and overhead lines	May become unsafe through deterioration.	Electric shock	Medium	• Regular inspection and maintenance.
Overhead lines	Exclusion zones compromised (equipment stored in exclusion zones, harvesters or spray pipes driven into exclusion zones).	Electric shock	High	• Check for locations of EQ overhead powerlines at: www.lookupandlive.com.au • Map out EQ and private power lines on property. • Identify exclusion zones. • Inform workers of power line locations and exclusion zones. • Regularly check that nothing us built or stored in, or work occurs in, exclusion zones.
Refrigeration equipment in dairy	May have moisture ingress.	Corrosion, electric shock risk	Medium	• Regular inspection and maintenance.
Socket outlets in dairies	May have unsafe equipment plugged in, or outlets or wiring damaged.	Electric shock	Medium	• Regular visual check. • Maintenance plan for plug in equipment and safety switch protection.
Fixed operations equipment, e.g. irrigation pump motors, feed delivery systems	Wear and tear could cause deterioration of insulation and earthing.	Electric shock	Medium	• Regular visual check. • Regular maintenance by licensed electrical persons and safety switch protection for up to 5kW equipment.
Lunch room equipment	Increased risk area.	Electric shock	Medium	• Equipment selected fit for purpose. • Safety switch protection and inspection test and maintenance regime.