

Electrical Safety Code Of Practice 2010 Electrical Equipment Rural industry

Electrical Safety Office Queensland

Electrical Safety Office Queensland

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Part 1 : Introduction

1.1 Application and scope of Code

- This *Electrical Safety Code of Practice 2010 – Electrical Equipment Rural Industry* (the Code) replaces the *Code of Practice Electrical Equipment Rural Industry 2006*.
- This Code was made on 18 December 2009.
- This Code commenced on 1 January 2010.
- This Code expires 10 years after the above commencement date.

1.2 Legislative framework

The *Queensland Electrical Safety Act 2002* (the Act) and its subordinate legislation, the *Electrical Safety Regulation 2002* (the Regulation), set out the obligations that entities, employers, employees, workers, designers, manufacturers, importers and persons in control of **electrical equipment** must meet in order to comply with the requirements of the law.

The fundamental principle of the legislation is to set legal requirements to ensure the electrical safety of licensed electrical workers, other workers, licensed electrical contractors, consumers and the general public.

The *Workplace Health and Safety Act 1995* (WHS Act) places obligations on certain persons to ensure workplace health and safety. Workplace health and safety is ensured when persons are free from death, injury or illness and the risk of death, injury or illness created by workplaces, relevant workplace areas, work activities or plant or substances for use at a workplace.

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

The Regulation prescribes, among other things, the requirements for rural industry work.

While this Code gives practical advice on ways to manage obligations under the Act, it does not provide advice about all electrical safety obligations. Four other codes of practice made under the Act are:

- *Electrical Safety Code of Practice 2010 – Working Near Exposed Live Parts*
The *Electrical Safety Code of Practice 2010 – Working Near Exposed Live Parts* gives practical advice on ways to manage electrical risk when working near exposed live electrical parts. The code applies to people such as plant operators, painters, people erecting or working on scaffolds, sign makers and people working with irrigation pipes near exposed live electrical parts. The practical guidance provided in the code may be relevant to electrical workers when they are performing electrical work near another exposed live part.
- *Electrical Safety Code of Practice 2010 – Electrical Work*
The *Electrical Safety Code of Practice 2010 – Electrical Work* provides practical advice and gives benchmarks for performing electrical work in ways that are electrically safe. The code provides guidance on managing electrical risk only no guidance on other risks is provided. This code has been designed to reflect the two ways to perform electrical work – working de-energised and working live.
- *Electrical Safety Code of Practice 2010 – Works*
The *Electrical Safety Code of Practice 2010 – Works* provides practical advice for an electricity entity to manage electrical safety risks associated with earthing systems, underground cable systems and supporting structures of overhead lines forming part of the works of an electricity entity.
- *Electrical Safety Code of Practice 2010 – Risk Management*
The *Electrical Safety Code of Practice 2010 – Risk Management* gives practical ways of managing electrical safety risks. The code clearly defines and explains the five step risk management process that obligation holders under the Act should perform to make sure all electrical risks are minimised.

References to legislation, Australian Standards and other documents in this Code are current at the time of printing. From time to time amendments are made to legislation. The user should therefore check to ensure applicable legislation is current at the time of reading.

1.3 What is a code of practice?

A code of practice is a document made under section 44 of the Act. It gives practical advice on ways of discharging a person's electrical safety obligation. Included in a code are ways to identify and manage exposure to risks of injury and property damage caused directly or indirectly by electricity.

Under section 45 of the Act, the code of practice does not state all that a person must do, or must not do, to discharge their electrical safety obligation.

However, the person fails to discharge the electrical safety obligation if they:

- (a) contravene, or otherwise act inconsistently with, the code; and
- (b) do not follow a way that is as effective as, or more effective than, the code for discharging the electrical safety obligation.

1.4 What is this Code about?

This Code gives practical advice about how to manage electrical risk in rural industry work. Included in the Code are relevant provisions of the Act and Regulation that **must** be complied with. Where wording in the Code says a measure **must** be used, the measure is a regulatory provision. Where the Code advises that a measure **should** be used, this means that it is a way of meeting an obligation under the Act. You **must** either follow the Code or use another way that is at least as effective as the Code.

This Code should be used by employers and self-employed persons whose business or undertaking includes rural industry work, to ensure that their electrical safety obligations are met.

1.5 Meaning of rural industry work

As set down in section 83A of the Regulation, rural industry work is work:

- in the cultivation of any agricultural crop or product whether or not grown for food; or
- in the rearing and management of farm animals for example livestock, bees or worms; or
- in the classing, scouring, sorting or pressing of wool; or
- that is aquaculture; or
- in flower or vegetable market gardens; or
- 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 an employer or self-employed person, including by his or her employee, carrying on the business or undertaking in which the product of the construction work, manufacturing work or office work is to be used; and
- 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; and
- work in conducting a tour associated with rural industry work.

Because rural industry work does not include other commercial activities such as manufacturing or 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 Act are complied with.

In addition, the Regulation for rural industry work and this Code do not alter any other regulatory requirements under the 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.

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

- 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; and
- managing the stated electrical risk factors associated with electrical equipment by:
 - assessing the risks and implementing control measures;
 - using safety switch protection or regular testing and inspection;
 - visually checking all electrical equipment prior to use or connection; and
 - continuing to monitor work areas and electrical equipment on an ongoing basis.

1.6 What does this Code apply to?

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; and
- areas where safety switches may be required.

1.7 Obligations under the *Electrical Safety Act 2002*

Part 2 of the Act imposes obligations on persons who may affect the electrical safety of others by their acts or omissions.

For example, employers have an obligation to ensure their business or undertaking is conducted in a way that is electrically safe. This includes identifying electrical risks, assessing the risk of injury or property damage that may be attributed to risks, and taking necessary actions to minimise risk exposure.

1.8 How can you meet your obligations for electrical safety?

Under sections 41 to 45 of the Act, there are three ways you can meet your electrical safety obligations: either through regulation, ministerial notices or codes of practice. Where applicable, you must comply in the following manner to meet your obligations:

- a) if a regulation is identified as prescribing a way of discharging an electrical safety obligation, you will fail to meet its obligation if you contravene the regulation;
- b) if a ministerial notice prescribes a way of meeting an electrical safety obligation in relation to an electrical risk, you will fail to meet that obligation if you contravene the ministerial notice; and
- c) if a code of practice states a way of meeting its electrical safety obligation, you will fail to meet that obligation if you:
 - contravene the code or act in a way inconsistent with the code; and
 - do not follow a way that is equally effective to, or more effective than, the code of practice for discharging your electrical safety obligation.

If this Code is inconsistent with the Regulation, then the Regulation prevails to the extent of the inconsistency.

1.9 Defences for failing to meet your electrical safety obligation

Under sections 46 and 47 of the Act, if charged with a breach of obligation, you can provide a valid defence by establishing that the offence was due to causes beyond your control. In this instance, you cannot claim as a defence those sections of the Criminal Code relating to an accidental act or omission, or a mistaken belief.

Where there is no regulation, ministerial notice or code of practice advising how to meet your electrical safety obligation under the circumstances, you should be able to demonstrate that you chose an appropriate way, took reasonable precautions and exercised proper diligence to discharge the safety obligation.

1.10 Who has obligations under the *Electrical Safety Act 2002*?

Section 29 to 40 of the Act imposes obligations for electrical safety on a number of persons, as follows:

- electricity entities;
- employers;
- self-employed persons;
- designers of electrical equipment and electrical installations;
- manufacturers of electrical equipment;
- importers of electrical equipment;
- suppliers of electrical equipment;
- installers of electrical equipment and electrical installations;
- repairers of electrical equipment and electrical installations;
- persons in control of electrical equipment;
- workers at places where electrical equipment is located; and
- other persons at places where electrical equipment is located.

A person may owe electrical safety obligations in more than one capacity. Typically, a person who conducts a business or undertaking that includes rural industry work will have electrical safety obligations as an employer or self-employed person, and as a person in control of electrical equipment. Further, if you imported specialist electrical equipment for rural industry work, you would also have an obligation as an importer of electrical equipment.

If a person had the obligations mentioned above, this would mean that their obligations would include:

- for an employer or self-employed person, ensuring that all electrical equipment used in conducting the person's business or undertaking is electrically safe;
- for a person in control of electrical equipment, ensuring that electrical equipment is electrically safe; and
- for an importer of electrical equipment:
 - ensuring that electrical equipment is designed to be electrically safe; and
 - is tested and examined to ensure it is electrically safe.

As indicated above, other people can have electrical safety obligations. For example, a worker at a place where electrical equipment is located has the following obligations:

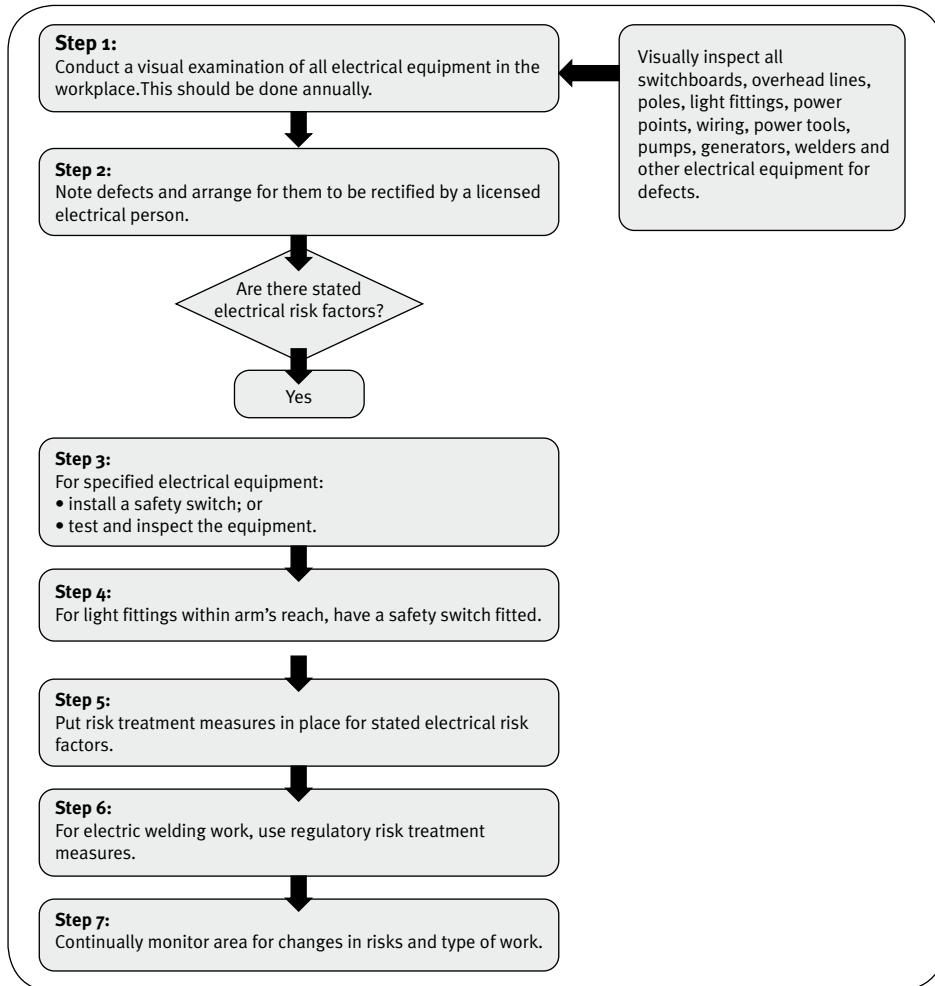
- to comply with the instructions for the electrical safety of persons and property at the place given:
 - by the worker's employer; and
 - to the extent the instructions are not inconsistent with instructions given by the worker's employer, by the person in control of the electrical equipment;
- to use personal protective equipment, if:
 - the protective equipment is provided by the worker's employer or the person in control of the electrical equipment for electrical safety purposes; and
 - the worker is properly instructed in the use of the protective equipment provided;
- not to willfully interfere with or misuse anything provided for electrical safety at the place; and
- not to willfully place any person, including the worker, at the place in electrical risk.

1.11 Penalty for failure to meet an electrical safety obligation

Under section 27 of the Act a maximum penalty for failing to discharge an electrical safety obligation

- a) if the breach causes multiple deaths: 2000 penalty units or 3 years imprisonment; or
- b) if the breach causes death or grievous bodily harm: 1000 penalty units or 2 years imprisonment; or
- c) if the breach causes bodily harm: 750 penalty units or 1 year's imprisonment; or
- d) otherwise 500 penalty units or 6 months imprisonment.

1.12 Flow chart: what are you required to do?



This Code should be read in conjunction with the Act, the Regulation, and other relevant codes of practice. Hard copies of these documents are available from the Queensland Government Bookshop by phoning (07) 3883 8700 or 1800 801 123 (outside Brisbane), or by visiting www.bookshop.qld.gov.au.

Further information on electrical safety is available from the Department of Justice and Attorney-General website at www.electricalsafety.qld.gov.au or by phoning the Infoline on 1300 650 662.

Part 2 : Initial and annual visual examination

2.1 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 sub-sections 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 person are the only people permitted to rectify the problems involving electrical work.

This visual examination should be conducted once every 12 months.

2.1.1 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*.

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.

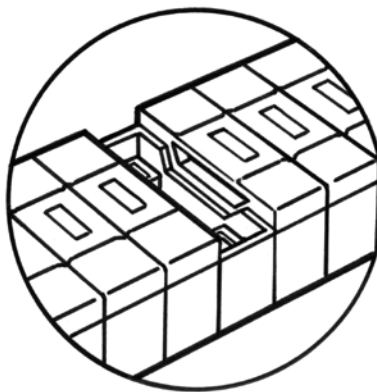


Figure 1

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.

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.

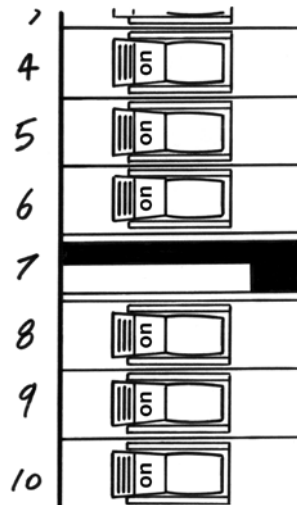


Figure 2

2.1.2 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).

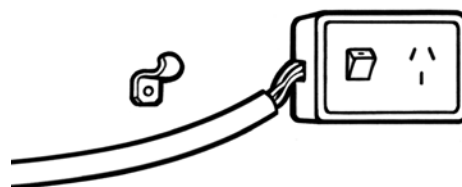


Figure 3

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.

2.1.3 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.

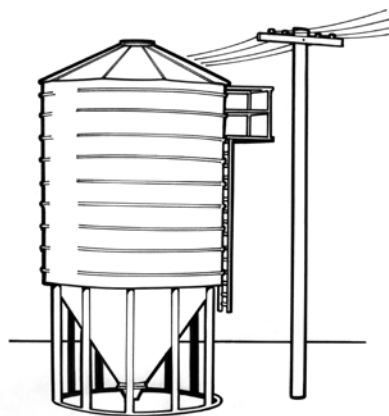


Figure 4

2.1.4 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, every five years. Pole inspections must be carried out by someone with the appropriate skills and knowledge.

2.1.5 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 person.

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.

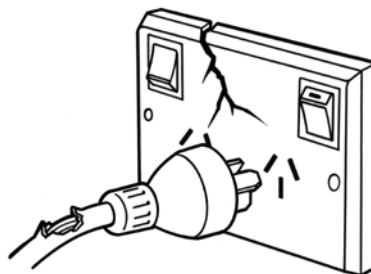


Figure 5

2.1.6 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); and
- 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.

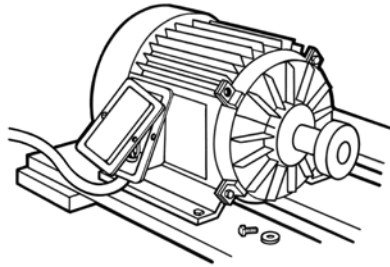


Figure 6

2.2 Visual examination of handheld electrical equipment

An employer 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; and
- obstruction to ventilation inlets and exhausts.

The illustrations at right 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.

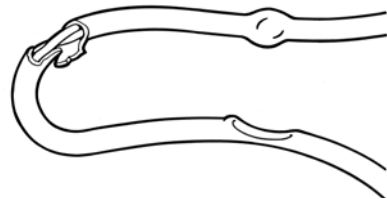


Figure 7

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

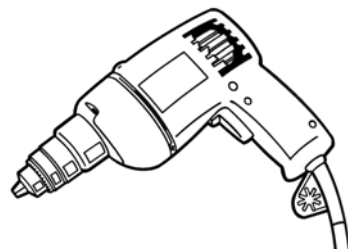


Figure 8

Figure 9 shows an extension socket that is cracked and split.

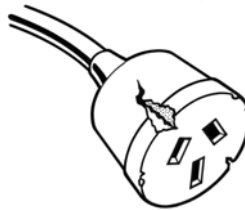


Figure 9

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

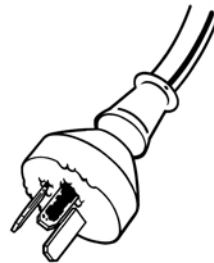


Figure 10

2.2.1 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; and
- either:
 - repaired by a licensed electrical person; or
 - 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 person 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:

- persons are kept clear of exposed live parts; and
- a licensed electrical person attends to make the equipment safe.

Part 3 : 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 94G(5) of the 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; or
- 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); and
- corrosive chemicals in the air.

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

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

Under section 94G of the Regulation, if proposed work involves a stated electrical risk factor, risk treatment measures (as outlined in Part 4 of this Code) must be implemented to prevent the electrical risk from the stated electrical risk factor.

Under section 94G of the Regulation, if specified electrical equipment is used by the employer or self-employed person 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; or
- 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; and
- 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.

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.

3.2 Safety switches

Safety switches 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: In service safety inspection and testing of electrical equipment*.

3.2.1 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 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.

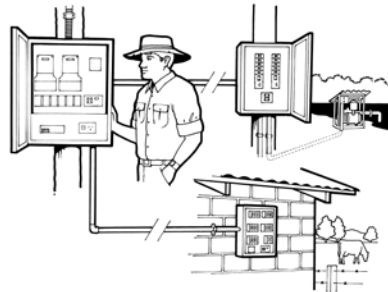


Figure 11

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

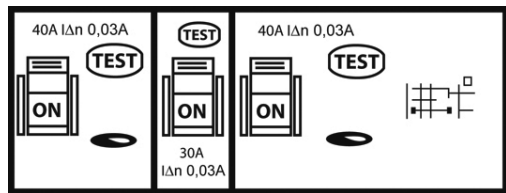


Figure 12

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

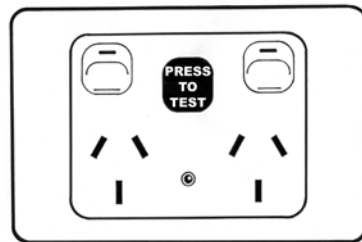


Figure 13

Figure 14 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.

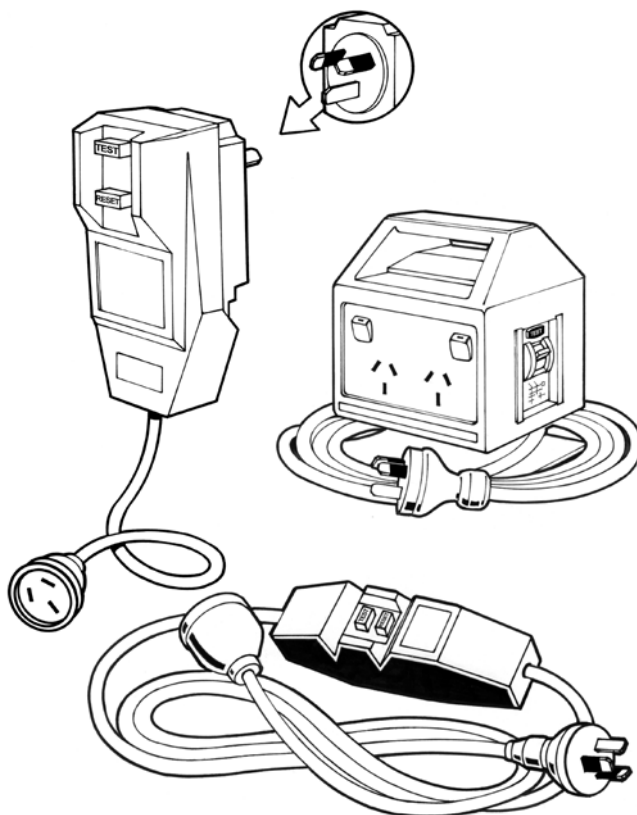


Figure 14

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; and
- 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).

3.2.2 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; or
 - 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.

3.2.3 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 pushing the 'test' button on the unit. The safety switch will automatically trip 'off', confirming it is operating correctly. If the safety switch does not operate, you must have the unit checked or replaced by a licensed electrical person 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, 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 every three months.

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

Under section 30 of the Act, you have an obligation to ensure that your business or undertaking is conducted in a way that is electrically safe. The obligation 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.

Part 4: Risk Management

'Risk management' is defined by the Australian / New Zealand Standard *AS/NZS ISO 31000:2009 Risk Management* as 'the coordinating of activities to direct and control an organisation with regard to risk'.

The term 'hazard' is often used as an identifier of potential sources of risk. However in the practical application of risk management principles, it is the risk itself that must be addressed. The *AS/NZS ISO 31000:2009 Risk Management Standard* (the Standard) refers to the identification of risk, while the term hazard is used in Workplace Health and Safety and Electrical Safety legislation in the same context. Similarly, 'risk control' is referred to in the Standard as 'risk treatment'. These distinctions are definitional only and the terms 'risk' and 'treatment' are used in this code for the purposes of clarity and consistency with the Standard.

The risk management process required by the WHS Act is systematically divided into five steps:

1. identify hazards (risks under the Standard), based on experience, recorded data and other information;
2. assess risks that may result by making an evaluation of the level of risks to the health and safety of workers, based on the consequences and likelihood of harm;
3. decide on control measures (risk treatment measures under the Standard) from the hierarchy of control (risk treatment hierarchy) i.e. eliminate, substitute, isolate or engineer out the risks, or reduce them through administrative measures or personal protective equipment to prevent or minimise the level of the risks. This should be achieved by selecting the highest order control (treatment) method possible and then proceeding down the list in order;
4. implement the selected control (treatment) measure(s) in the workplace; and
5. monitor and review the effectiveness of the control (treatment) measures to ensure that they are working correctly to control (treat) the risks and that no other risks have been introduced.

NOTE: Compliance with the risk management process does not excuse a person from ensuring workplace health and safety or from complying with an obligation under the Act.

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 treatment. 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 low risk priority scores (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 Act requires that electrical work and associated equipment be electrically safe (sections 29 to 40); that is, free from electrical risk. 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.

In many circumstances, the risks associated with undertaking electrical work near exposed live parts can be equivalent to those associated with live electrical work. Evaluation of the risks and development of risk treatment measures as described in Part 5 of the *Electrical Safety Code of Practice 2010 - Risk Management* will provide assistance in developing safe work practices.

4.1 Risk

Risk is the likelihood and consequence of injury or harm occurring.

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 treatment measures in place.

4.2 The risk management process

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

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.

As set down in the *Electrical Safety Code of Practice 2010 – Risk Management*, there are five basic steps in the risk management process.

Step 1: Identify all risks by:

- observing, inspecting, investigating, communicating and consulting; and
- making a record of the risks identified.

Step 2: Assess the risks by:

- assessing and prioritising the risks;
- dealing with the highest priority risks first; and
- dealing with less risks or least significant risks last.

Step 3: Decide on measures to treat the risks by:

- A. eliminating the risk; or
- B. if elimination of the risk is not possible, select these treatment measures in the following order of preference:
- (i) substitution, e.g. using machines with better guarding;
 - (ii) isolation (not administrative), e.g. remove or separate people from the risk;
 - (iii) minimisation by engineering means, e.g. modify a machine so it can be used by remote control;
 - (iv) application of administrative measures, e.g. using signs, training or policies to treat risk; and
 - (v) use of personal protective equipment (PPE), equipment or clothing designed to protect the worker.

Step 4: Implement appropriate treatment measures that will:

- adequately treat the risks;
- not create other risks; and
- allow workers to do their work without undue discomfort or distress.

Step 5: Monitor the treatment measures and review the process:

A: Monitor

- Have the treatment measures been implemented as intended?
- Are the measures adequate?
- Did the implementation of the measures create other risks?

B: Review

- Has anything changed over time since the risk process was implemented?
- Is the treatment of risks still adequate?
- Was the risk management process conducted effectively?

For further information on risk management and guidelines on how to complete a risk assessment, please refer to the *Electrical Safety Code of Practice 2010 – Risk Management*.

The five step risk management process is illustrated in Figure 15 below.

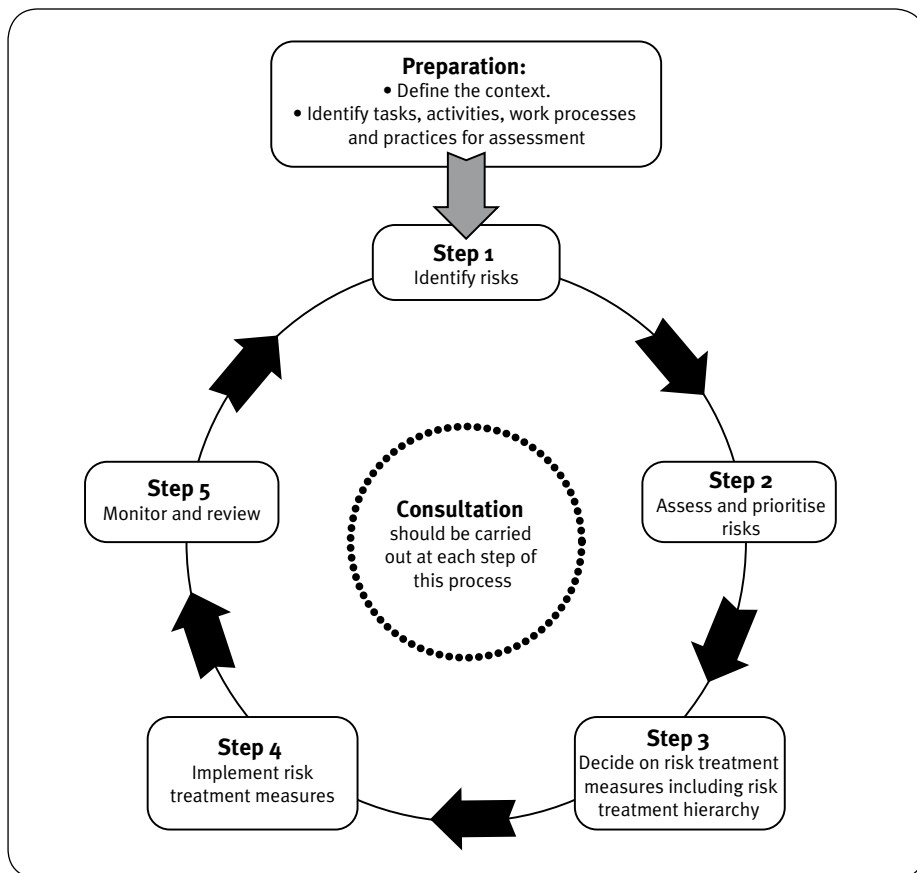


Figure 15

4.3 Maintenance regimes for electrical equipment used where there are stated electrical risk factors

An employer or self-employed person must ensure that all electrical equipment is maintained in a condition that is electrically safe. Maintenance of equipment includes maintaining safe methods of use of the equipment within the manufacturer's safe design parameters.

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.

4.4 Instruction, training and supervision

Under the *Workplace Health and Safety Act 1995* (section 28 and section 29), a person who conducts a business or undertaking must provide instruction, training and supervision to persons to whom they owe an obligation. The *Electrical Safety Act 2002* (section 30) sets down the obligation of an employer to ensure that their business or undertaking is conducted in a way that is electrically safe. Providing training to workers helps to ensure that employers meet this obligation.

Workers who are likely to be exposed to electrical risks and anyone supervising these workers should be trained and provided with information and instruction.

All people exposed to electrical risks should be provided with information about:

- (a) electrical safety legislation;
- (b) their organisation's electrical safety policy or program;
- (c) electrical safety risk management processes;
- (d) which measures are in place to minimise exposure to electrical risks;
- (e) correct use of risk treatment measures and how to ensure they are kept in working order;
- (f) any known residual risk;
- (g) safe work procedures;
- (h) how to use and maintain equipment; and
- (i) any special safety information needs.

Training should be appropriate to the type of work to be performed. In some cases, formal training may be required, in others, on-the-job training may be

more appropriate. The special needs of workers should be taken into account in deciding on the structure, content and delivery of training. This assessment should include literacy levels, work experience and specific skills required for a job.

Adequate and appropriate training is a way of managing the risks associated with electrical risks. This can be done by:

- (a) determining who needs to be trained;
- (b) determining what training is required;
- (c) determining how training will be delivered;
- (d) ensuring that the training is provided;
- (e) evaluating the training; and
- (f) keeping training records.

The amount of training will be determined by:

- (a) the nature of the workplace risks;
- (b) the degree of associated risk;
- (c) the complexity of work, such as operating procedures and equipment;
- (d) other controls being implemented; and
- (e) the qualifications and experience of the worker.

4.4.1 Types of training

There are different types of electrical safety training that have different purposes, including:

- (a) Induction training: for workers when commencing employment or when new to the job. This training is general and may involve a workplace tour, and information about conditions of employment, administration, organisational structure, emergency procedures and workplace amenities;
- (b) Supervisor and management training: provided to help ensure that the supervision and management of the electrical safety issues are appropriately carried out in the workplace;
- (c) Specific job training or familiarisation training: providing information about the electrical and other risks associated with the job;

- (d) Specific electrical risk training: providing information about the risks associated with working near exposed live parts;
- (e) Ongoing training or refresher training: provided periodically to ensure that work continues to be performed safely;
- (f) Emergency procedures training: provided to ensure workers know what to do in the event of an emergency, including identifying persons with specific emergency roles and responsibilities; and
- (g) First aid training: provided to ensure appropriate procedures are followed for administering first aid.

Part 5: Additional requirements for electric welding work

If welding is an activity conducted at your workplace, you must do what the Regulation says for all work areas. Under section 94G(1)(a) of the 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 treatment measures should include ways of preventing or minimising all risks, including electric shock, burns and inhalation of toxic gases.

5.1 Regulatory requirements for rural industry work

Under section 94G(1)(c) an employer or self-employed person must ensure that risk treatment measures are implemented for the risk of electric shock or burns from electric welding work performed in the employer or self-employed person's business or undertaking, including the wearing of protective clothing, gloves, footwear and eye protection.

In addition to this, other risk treatment 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); or
- a voltage reduction unit (this device reduces the open circuit voltage of a welder to a safe value); or
- 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:

Welding Technology Institute of Australia
TN 7-98 Health and Safety in Welding

Part 6: Hazardous Areas

6.1 Hazardous areas: where they exist

An area is considered hazardous if an explosive atmosphere is present or may be present. 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.

Typical examples of hazardous areas are:

- 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); and
- areas where flammable products are stored, used, or decanted.

6.2 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; and
- 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 skill enabling the person to inspect and test electrical equipment.

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*;
- a sheathed flexible cord; and
- a *cord extension socket*.

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

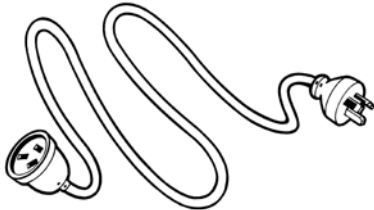


Figure 16: A cord extension set

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 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
- operated by electricity at an extra low voltage, if the equipment forms part of an electrical installation located in a hazardous area; or
- that is, or that forms part of, a cathodic protection system.

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; or
- its source of electricity is a unit of the vehicle that provides propulsion for 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.

Electrical installation (see section 15 of the Act) means a group of items of **electrical equipment**. However, a group of items of **electrical equipment** is an electrical installation only if:

- all the items are permanently electrically connected together; and
- the items do not include items that are works of an electricity entity; and
- electricity can be supplied to the group from the works of an electricity entity or from a generating source.

An item of **electrical equipment** can be part of more than one electrical installation.

Please note: 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; and
- the switchboard, wiring, lighting, socket outlets and other **electrical equipment** permanently connected for a dairy.

Electrical risk (see section 10 of the 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; or
- in relation to property, the risk to the property of:
 - damage caused by a cathodic protection system; or
 - loss or damage caused directly by, or originating from, electricity.

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

- for a person or property, that the person or property is free from *electrical risk*; and
- for *electrical equipment* or an electrical installation, that all persons and property are free from *electrical risk* from the equipment or installation; and
- 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; and
- for the way electrical work is performed, that all persons are free from *electrical risk* from the performance of the work; and
- 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; and
- 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 Act), for a person or property, means the person or property is electrically safe.

Electrical safety examination means a procedure which includes:

- an inspection to identify visually identifiable defects that cause the equipment to be electrically unsafe;
- an operational test of *safety switches*; and
- 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 is as low as reasonably achievable, having regard to the likelihood of harm and the likely severity of harm.

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.

A **penalty unit** has a dollar value determined by the Queensland Department of Justice and the Attorney-General (at the date of publication, the value of a penalty unit was \$75).

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.

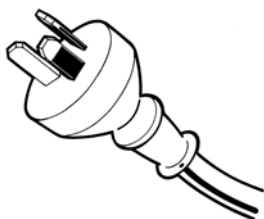


Figure 18: A plug

Safety switch or residual current device 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 used to prevent serious injury to persons must have a current Queensland or external approval and a tripping current not exceeding 30 mA, and a tripping time not exceeding 300 mS.

Specified electrical equipment (section 83 of the 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; and
 - is connected by a flexible cord and *plug* to low voltage supply.

Stated electrical risk factor (section 94G(5) of the 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; or
- 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; and
- 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; and
- implementation of a safe system of work.

Generally, the two distinct styles of supervision are described as:

- **Direct supervision** means supervision occurs at all times on a direct and constant basis.
- **General supervision** means supervision where the worker does not require the constant attendance of the supervisor.

The **Act** means the *Electrical Safety Act 2002*.

The **Regulation** means the *Electrical Safety Regulation 2002*.

The **WHS Act** means the *Workplace Health and Safety Act 1995*.

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

- extra low voltage not exceeding 50Va.c. or 120V ripple free d.c.;
- low voltage exceeding extra low voltage but not exceeding 1000Va.c or 1500Vd.c.; and
- high voltage exceeding low voltage.

Work (see section 59 of the Regulation) means work of any type, whether or not electrical work, other than live work or electrical welding performed in accordance with a safe system of work.

Appendix B: Sample risk assessment

This risk assessment form gives an example of a dairy farm installation and equipment. The risks have been identified and rated and the risk treatment measures that have been used to manage the risks have been selected. This risk assessment needs to be reviewed regularly. **Note:** the Regulation requires certain measures for specified electrical equipment.

Sample risk assessment

Electrical equipment	Circumstance	Risk	Risk level	Risk treatment measures
Main switchboard	If removed fuses have exposed live parts.	Electric shock and explosion	Low	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Regular inspection and maintenance.
Refrigeration equipment in dairy	May have moisture ingress	Corrosion, electric shock risk	Medium	<ul style="list-style-type: none"> Regular inspection and maintenance.
Socket outlets in dairies	May have unsafe equipment plugged in, or outlets or wiring damaged.	Electric shock	Medium	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Equipment selected fit for purpose. Safety switch protection and inspection test and maintenance regime.

