

Guide to managing electrical equipment in department schools and workplaces

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Part 1: Electrical safety requirements

1.1 Legislative requirements

The [Electrical Safety Act 2002 \(Qld\)](#) and [Electrical Safety Regulation 2013 \(Qld\)](#) establish the legislative requirements that must be followed in relation to electrical safety. Children and young people make up the majority of the population at our schools, so in some instances, our department has implemented processes that exceed the regulatory requirements to further minimise the risk of injury to students and staff.

Our department has liaised with the Queensland regulator of electrical legislation to develop this guide to meet the requirements related to electrical equipment and help schools and workplaces maintain electrical safety.

The *Work Health and Safety Act 2011* and *Electrical Safety Act 2002* apply to contactors engaged to conduct work at departmental sites. The *Working on Department of Education Facilities* document, which forms part of the contract through procurement activities, reminds contractors of these legislative responsibilities and their responsibility to consult and coordinate with other work health and safety duty holders on safety aspects (such as electrical safety) that may impact on other duty holders.

1.2 What are electrical risks?

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

- electric shock causing injury or death e.g. a faulty light switch or exposed electrical wire in a cord
- arcing, explosion or fire causing burns e.g. fault in an electrical switchboard
- fire resulting from an electrical fault
- toxic gases released from burning materials caused by electrical fires causing illness or death.

Even the briefest contact with electricity at 50 volts (V) for alternating current (A.C.) or 120 V for direct current (D.C) can have serious consequences to a person's health and safety.

Electric shocks can lead to falls from ladders and injury from power tools. Other outcomes may include muscle spasms, palpitations, nausea, vomiting, collapse and unconsciousness ([section 3.7](#)).

Employees 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 or damage to assets and infrastructure. We can manage electrical risks by ensuring we maintain electrical safety in our schools and workplaces.

1.3 What must be done to ensure electrical safety in schools?

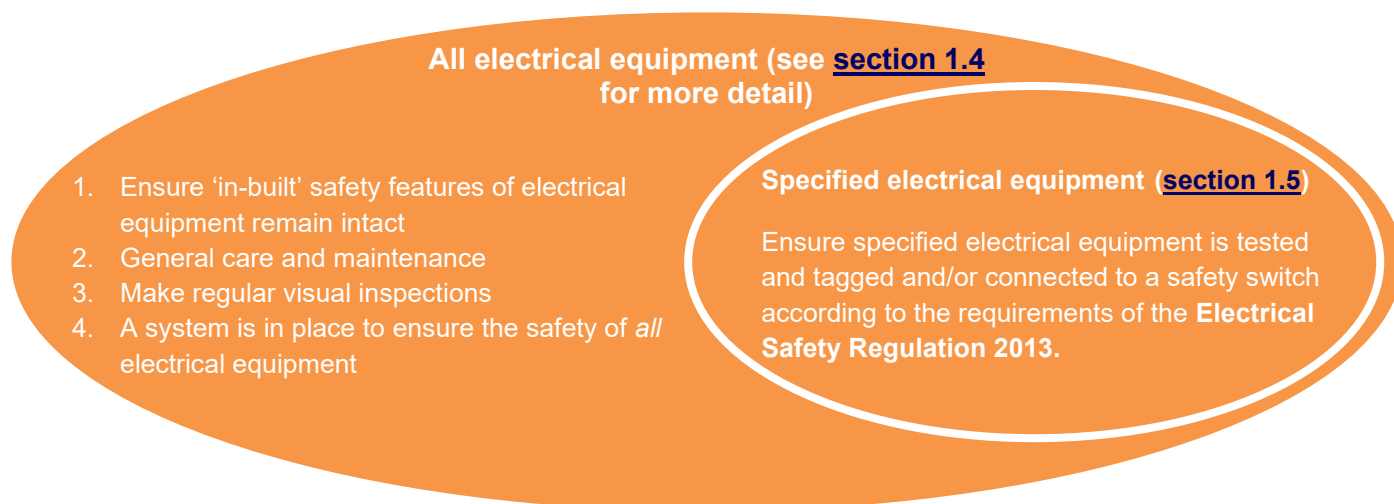
Ensuring electrical safety protects students, staff and others from injury relating to electricity, and can also prevent property damage. Department schools and workplaces must:

- Purchase appropriate equipment for the task and amount of use. Electrical equipment and appliances sold in Queensland must comply with the *Electrical Safety Act 2002* and the *Electrical Safety Regulation 2013*. Importers, designers, manufacturers, retailers, wholesalers, and other suppliers are required to ensure the products they supply are electrically safe and meet the relevant standards.
- Follow [general precautions](#) to ensure the electrical safety of **all electrical equipment** (full details are provided in [section 1.4](#)).

- Protect [specified electrical equipment](#) according to the requirements of the Electrical Safety Regulation 2013 ([section 1.5](#)).
- **Record and notify** electrical incidents as required by the *Work Health and Safety Act 2011*, *Electrical Safety Act 2002* and Electrical Safety Regulation 2013. These requirements are provided in departmental procedure [Health, safety and wellbeing incident management](#).
- Ensure all staff, students and others using electrical equipment have the **appropriate skills**, information and training to perform the task safely.

The department has, in some cases, implemented guidance that exceeds the regulatory requirements to further minimise the risk of injury to our students, staff and visitors.

An overview of electrical safety requirements:



1.4 General precautions for all electrical equipment

Legislation requires that the safety of all electrical items be ensured. The following general procedures must be followed for the use of **all** electrical equipment:

1.4.1 Ensuring 'in-built' safety features of electrical equipment remain intact

Appropriately designed and manufactured electrical equipment has some 'in-built' safety features that protect the user from harm related to electricity. To ensure these features remain intact and are effective:

- use equipment according to instructions; including any care and maintenance instructions
- use appropriate equipment for the task – e.g. do not use domestic equipment for industrial purposes
- do not remove any casings or covers that enclose electrical parts
- do not insert inappropriate items (e.g. metal implements) into electrical equipment
- do not attempt repairs – use a licensed electrical worker (e.g. an electrician).

1.4.2 General care and maintenance

- Protect leads and equipment from damage e.g. position leads and equipment where they are not likely to be damaged or affected by liquids.

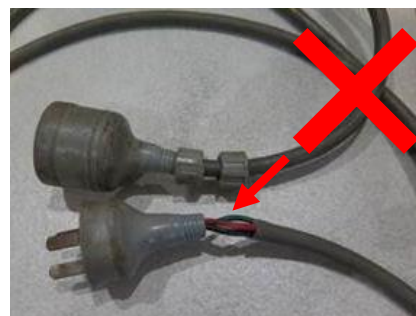
- Remove faulty electrical items from use immediately to ensure the item is not used inadvertently by someone else; discard it, or clearly label it as 'faulty' or 'out of service' and have it repaired by an electrician.
- Use multi-outlet power boards instead of double adaptors but do not overload. 'Piggy backing' or 'daisy chaining' of power boards allows for a greater number of appliances to draw large amounts of power from the power boards, creating a potential overheating hazard or fire.

1.4.3 Making regular visual inspections

More than 90% of defects are detectable by visual inspection. It only takes a few seconds to check the item before you use it.

Check the lead, plug, socket and item for:

- cuts or other damage that exposes the insulation of the inner cores or conductors
- melted, scorched or burnt areas
- damage to covers, guards and controls (e.g. switches)
- cracks and holes that may expose live parts
- obstructed ventilation inlets and exhausts
- deformed leads e.g. permanently twisted.



1.4.4 Electrical items that are not specified electrical equipment

For electrical equipment that is [not specified electrical equipment](#) (e.g. fridges, computers) the Regulation does not prescribe the way to ensure electrical safety. This is because the risks are seen to be much lower for these types of equipment. For example, the risks (e.g. of electric shock) associated with using a refrigerator in a staff room are much lower than the risks associated with students operating a power drill during industrial technology.

There is still the general duty to ensure electrical safety for these items so your school may choose to take extra precautions in addition to steps 1-3 listed above for some items.

For example:

- identify if there are any electrical items that may be exposed to the risk of damage – see examples in [section 1.7](#)
- implement a test and tag regime or install a safety switch to increase the level of protection for users.

This approach shows a risk management process has been used and is a way of proving that a system is in place to ensure electrical safety for all electrical equipment.

Be aware of hidden dangers:

- ➡ Never use damaged power points, switches, equipment or cords.
- ➡ Isolate damaged items from their power supply and remove from service until repaired.

1.5 What is specified electrical equipment?

Specified electrical equipment is defined in the Electrical Safety Regulation 2013 as any equipment that meets any of the following criteria:

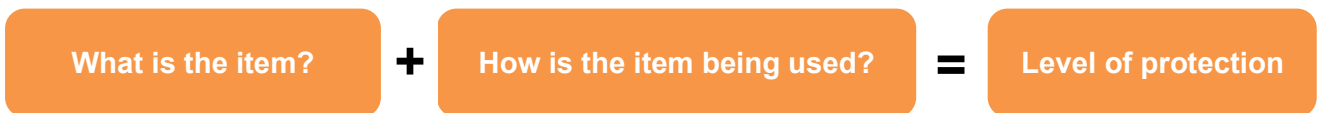
- **All extension leads** (cord extension sets with a current rating of not more than 20 amps).
- **All power boards** (portable outlet devices with a current rating of not more than 20 amps).
- Electrical equipment that is connected by a flexible cord and plug to low voltage supply, has a current rating not more than 20 amps and is used to perform **manufacturing work**. e.g. a bench grinder.
- Equipment that is:
 - connected by a flexible cord and plug to a low voltage supply
 - is used to perform 'service or office work'
 - is moved during its normal use for the purpose of its use e.g. a hand held blow dryer, hot glue gun.

Specified electrical equipment is also grouped into 6 'categories' according to how the equipment is being used. The way a piece of electrical equipment is operated influences the likely wear and tear or damage to the equipment and consequently the level of risk of injury to users.

Our department has liaised with the Queensland Regulator of electrical legislation to clarify the categories of work relevant to school activities. Electrical equipment will predominantly be used in **manufacturing, service and office work** by school staff or students and other department workplaces.

- construction work
- manufacturing work
- service work
- office work
- amusement work (e.g. amusement rides)
- rural work

See [section 1.6](#) for examples of school activities, related category of work and the mandatory control measures.



1.6 Categories of specified electrical equipment and controls

1.6.1 Construction work

Construction work (WHS Regulation s289) is any work carried out in connection with the construction, alteration, conversion, fitting-out, commissioning, renovation, repair, maintenance, refurbishment, demolition, decommissioning or dismantling of a structure.

Note: construction work does not include testing, maintenance or repair work of a minor nature carried out in connection with a structure (WHS Regulation s289 3d).

The regulatory provisions for construction work are more stringent than for other categories of work due to the high level of risk. If school staff are to undertake construction work the requirements listed below, including the frequency of testing of equipment, should be carefully considered in the planning of the work.

For ‘construction work’ all electrical equipment must meet the requirements of AS/NZS 3012 and:

Table 1: Construction work									
School application	Electrical protection required								
<ul style="list-style-type: none"> Building a retaining wall Note: if schools officers are conducting construction work these requirements must be fulfilled For minor repairs – see ‘manufacturing work’ <p>Double adaptors or piggyback plugs must not be used</p>	<p>All electrical equipment</p> <ul style="list-style-type: none"> Inspected, tested and tagged by a competent person every 3 months <p>AND</p> <ul style="list-style-type: none"> Connected to one of the following: <ul style="list-style-type: none"> a safety switch permanently installed at the switchboard; or a portable safety switch. <p>Safety switches (section 3.2)</p> <p>Fixed safety switches (permanently installed at the switchboard)</p> <ul style="list-style-type: none"> Push button test (by user): monthly; and <table border="1" style="width: 100%;"> <tr> <td colspan="2">The following tests are conducted for fixed (permanently installed) safety switches only as part of the department’s centrally funded Service Maintenance Program by a Licensed Electrical Worker. (Refer to s3.2.4.)</td> </tr> <tr> <td style="width: 50%;">6 monthly</td> <td style="width: 50%;">12 monthly</td> </tr> <tr> <td>Test fixed safety switches using their inbuilt test button and record results in service report</td> <td>Test fixed safety switches using their inbuilt test button and record results in service report</td> </tr> <tr> <td></td> <td>Inspect, test (trip time and current) and tag fixed safety switches and record results in service report</td> </tr> </table> <p>Any requirements for testing of fixed safety switches at a higher frequency than under the Service Maintenance Program should be directed the Regional Infrastructure Manager.</p> <p>Portable safety switches</p> <ul style="list-style-type: none"> Push button test (by user): daily or before every use (whichever is longer); and Test for operating time/current by competent person: every 3 months. 	The following tests are conducted for fixed (permanently installed) safety switches only as part of the department’s centrally funded Service Maintenance Program by a Licensed Electrical Worker. (Refer to s3.2.4.)		6 monthly	12 monthly	Test fixed safety switches using their inbuilt test button and record results in service report	Test fixed safety switches using their inbuilt test button and record results in service report		Inspect, test (trip time and current) and tag fixed safety switches and record results in service report
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1.6.2 Manufacturing work

Manufacturing work is the assembly, disassembly, fabrication, installation, maintenance, manufacturing, refurbishment or repair, but does not include amusement work, construction work or rural industry work.

For ‘manufacturing work’ – specified electrical equipment* is either:

- an extension cord
- a power board
- electrical equipment that is used to perform manufacturing work and has a flexible cord and plug e.g. bench grinder, angle grinder, hand held electric drill. Refer to Electrical Safety Regulation 2013 s97.

1.6.2.1 Use of safety switches for schools officer activities

Schools officers **must** have safety switch protection on the specified electrical equipment they use for work e.g. electric bench grinder, drill or electric sander.

- A fixed safety switch is to be installed to protect circuits in the schools officers shed or workshop.
- When performing work around the school site, safety switch protection can be provided through fixed safety switches or via a portable safety switch. A portable safety switch must be used unless there is verification that all circuits have fixed safety switch protection.

Table 2: Manufacturing work

School application	Electrical protection required								
<ul style="list-style-type: none"> • Industrial technology and design (ITD) • Ag science/workshops • Schools officer tasks such as maintenance or repair work of a minor nature e.g. installation of shelving (see note regarding construction work) <p>Double adaptors or piggyback plugs must not be used</p>	<p>Specified electrical equipment Inspected, tested and tagged by a competent person:</p> <ul style="list-style-type: none"> • double insulated – 12 monthly; or • not double insulated – 6 monthly <p>AND Connected to one of the following:</p> <ul style="list-style-type: none"> • a safety switch permanently installed at the switchboard in a permanent workplace e.g. in schools officer’s shed or permanent work shop; or • a portable safety switch when <u>not</u> in a permanent workplace e.g. schools officers working around the school. <p>Safety switches (section 3.2) Fixed safety switches (permanently installed at the switchboard)</p> <table border="1"> <tr> <td colspan="2">The following tests are conducted for fixed (permanently installed) safety switches only as part of the department’s centrally funded Service Maintenance Program by a Licensed Electrical Worker. (Refer to s3.2.4.)</td> </tr> <tr> <td>6 monthly</td> <td>12 monthly</td> </tr> <tr> <td>Test fixed safety switches using their inbuilt test button and record results in service report</td> <td>Test fixed safety switches using their inbuilt test button and record results in service report</td> </tr> <tr> <td></td> <td>Inspect, test (trip time and current) and tag fixed safety switches and record results in service report</td> </tr> </table> <p>Portable safety switches</p> <ul style="list-style-type: none"> • Push button test (by user) – daily or before every use (whichever is longer); and • Test for operating time/current by competent person – 12 monthly 	The following tests are conducted for fixed (permanently installed) safety switches only as part of the department’s centrally funded Service Maintenance Program by a Licensed Electrical Worker. (Refer to s3.2.4.)		6 monthly	12 monthly	Test fixed safety switches using their inbuilt test button and record results in service report	Test fixed safety switches using their inbuilt test button and record results in service report		Inspect, test (trip time and current) and tag fixed safety switches and record results in service report
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Table 2.1: Manufacturing work near water

School application	Electrical protection required
<p>Repair work around swimming pools, ponds, water features etc.</p> <ul style="list-style-type: none"> • Repairing tiles around pool • Changing light fixtures or fittings • Refixing brackets and fasteners in and around pool 	<p>Extension leads, electrical appliances and cords must not be used where there is a risk of them coming into contact with, or falling into water.</p> <p>When working near water e.g. around pools or ponds, battery powered (cordless) or non-powered equipment is to be used instead of electrical equipment connected to mains power.</p> <p>For more information see the WorkSafe Qld website – Electricity around water.</p>

1.6.3 Service Work

Service work is work that is not office, manufacturing, construction, amusement or rural. For 'service work' – specified electrical equipment* is:

- an extension cord
- a power board, or
- electrical equipment that has a flexible cord and plug and is moved during its normal use for the purpose of its use e.g. hot glue gun, electric engraver, hair dryer.

Note: Specific controls are in place for school cleaning equipment see table 3.2

Table 3: Service work – for legislative definition refer to Electrical Safety Regulation 2013, s97									
School application	Electrical protection required								
<ul style="list-style-type: none"> • Teaching – classrooms • Teacher aide activities e.g. preparation for class activities • Library • Making beverages/food • Kitchenettes/tea rooms • Selling goods from a shop e.g. uniform shop • Tuckshops • Cooking – home economics • Science laboratories • Kitchens at Outdoor Education Centres • Drama/performance# 	<p>Specified electrical equipment</p> <ul style="list-style-type: none"> • Inspected, tested and tagged by a competent person every 12 months; or • connected to a safety switch (permanently installed or portable type). <p>Safety switches (section 3.2)</p> <p>Fixed safety switches (permanently installed at the switchboard)</p> <table border="1"> <tr> <td colspan="2">The following tests are conducted for fixed (permanently installed) safety switches only as part of the department's centrally funded Service Maintenance Program by a Licensed Electrical Worker. (Refer to s3.2.4.)</td> </tr> <tr> <td>6 monthly</td> <td>12 monthly</td> </tr> <tr> <td>Test fixed safety switches using their inbuilt test button and record results in service report:</td> <td>Test fixed safety switches using their inbuilt test button and record results in service report:</td> </tr> <tr> <td></td> <td>Inspect, test (trip time and current) and tag fixed safety switches and record results in service report</td> </tr> </table> <p>Portable safety switches</p> <ul style="list-style-type: none"> • Push button test (by user): immediately after it is connected to a socket outlet; and 3 monthly; and • test for operating time/current by competent person – 12 monthly. 	The following tests are conducted for fixed (permanently installed) safety switches only as part of the department's centrally funded Service Maintenance Program by a Licensed Electrical Worker. (Refer to s3.2.4.)		6 monthly	12 monthly	Test fixed safety switches using their inbuilt test button and record results in service report:	Test fixed safety switches using their inbuilt test button and record results in service report:		Inspect, test (trip time and current) and tag fixed safety switches and record results in service report
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	Inspect, test (trip time and current) and tag fixed safety switches and record results in service report								

Table 3.1: Service work – drama / performance	
School application	Electrical protection required
<ul style="list-style-type: none"> • Drama curriculum • Performances • School events such as speech nights 	<p>#Drama/performance</p> <ul style="list-style-type: none"> • Piggyback plugs (preferably non-rewireable) are permitted for use with sound and light equipment in permanent theatre/venues. • Only non-rewireable piggyback plugs are to be used at temporary premises.

Table 3.2: Electrical safety requirements for cleaning equipment

School application	Electrical protection required								
<p>Cleaning equipment</p> <ul style="list-style-type: none"> • Cleaning equipment is operated in a range of environments and potentially exposed to damage, wear and tear due to the high level of use • Machines are sometimes operated on a wet surface e.g. when stripping or buffing floors or extracting water with a wet and dry vacuum cleaner • Cleaning equipment is used all over school campuses and therefore safety switch protection may not be provided over all circuits <p>Due to these factors the department has implemented specific electrical control measures for cleaning equipment.</p> <p>Double adaptors or piggyback plugs must not be used</p>	<p>Electrical cleaning equipment e.g. vacuums, polishers, scrubbers</p> <ul style="list-style-type: none"> • Daily visual checks as per instruction and training and inspected, tested and tagged every 6 months; or • daily visual checks as per instruction and training and connected to a safety switch (permanently installed or portable type). <p>Safety switches (section 3.2)</p> <p>Schools that do not have safety switch protection on all circuits are encouraged to purchase a portable safety switch for each school cleaner to use with their electrical equipment.</p> <p>Fixed safety switches (permanently installed at the switchboard)</p> <table border="1" data-bbox="451 745 1409 1120"> <tr> <td colspan="2" data-bbox="451 745 1409 853">The following tests are conducted for fixed (permanently installed) safety switches only as part of the department’s centrally funded Service Maintenance Program by a Licensed Electrical Worker. (Refer to s3.2.4.)</td> </tr> <tr> <th data-bbox="451 853 930 902">6 monthly</th> <th data-bbox="930 853 1409 902">12 monthly</th> </tr> <tr> <td data-bbox="451 902 930 1010">Test fixed safety switches using their inbuilt test button and record results in service report:</td> <td data-bbox="930 902 1409 1010">Test fixed safety switches using their inbuilt test button and record results in service report:</td> </tr> <tr> <td data-bbox="451 1010 930 1120"></td> <td data-bbox="930 1010 1409 1120">Inspect, test (trip time and current) and tag fixed safety switches and record results in service report</td> </tr> </table> <p>Portable safety switches</p> <ul style="list-style-type: none"> • Push button test (by user) – immediately after it is connected to a socket outlet; and 3 monthly; and • Test for operating time/current by competent person: 12 monthly (<i>ref: using commercial cleaning requirement</i>). 	The following tests are conducted for fixed (permanently installed) safety switches only as part of the department’s centrally funded Service Maintenance Program by a Licensed Electrical Worker. (Refer to s3.2.4.)		6 monthly	12 monthly	Test fixed safety switches using their inbuilt test button and record results in service report:	Test fixed safety switches using their inbuilt test button and record results in service report:		Inspect, test (trip time and current) and tag fixed safety switches and record results in service report
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1.6.4 Office work

For 'office work' – specified electrical equipment* is:

- an extension cord
- a power board, or
- electrical equipment that has a flexible cord and **is moved during its normal use for the purpose of its use.** e.g. electric engraver.

Table 4: Office work – for legislative definition refer to Electrical Safety Regulation 2013, s97

Application	Electrical protection required						
Administration tasks such as using computers, photocopying or faxing <ul style="list-style-type: none"> • Office work • Administration areas • Staff rooms 	Specified electrical equipment <ul style="list-style-type: none"> • Inspected, tested and tagged by a competent person every 5 years; or • connected to a safety switch (permanently installed or a portable type). Safety switches (section 3.2)						
	Fixed safety switches (permanently installed at the switchboard)						
	The following tests are conducted for fixed (permanently installed) safety switches only as part of the department's centrally funded Service Maintenance Program by a Licensed Electrical Worker. (Refer to s3.2.4.)						
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	Inspect, test (trip time and current) and tag fixed safety switches and to record results in service report						
Portable safety switches <ul style="list-style-type: none"> • Push button test (by user): immediately after it is connected to a socket outlet; and 3 monthly; and • Test for operating time/current by competent person 2 yearly. 							

1.6.5 Amusement work (e.g. amusement rides)

This category is relevant for contractors who supply and operate amusement rides for school fetes and functions – refer to the “Checklist for school fete/event organisers – mobile amusement devices”.

1.6.6 Rural industry work

For the purposes of schools, agricultural science activities have been included in the category of manufacturing work.

1.7 What is not specified electrical equipment?

Many electrical items do not meet the definition of 'specified electrical equipment' and the requirements listed above ([section 1.6](#)) do not have to be implemented for these pieces of equipment. However, there is still a requirement to ensure electrical safety for the use of these items. Your school may choose to take extra precautions in addition to general care and maintenance, for example;

- identify electrical items that are exposed to damage or greater wear and tear
- implement a testing and tagging regime or connection to a safety switch to increase the level of protection for users.

For example; these items are not specified electrical equipment however they may be exposed to damage or greater wear and tear:

- laptop computers*
- laptop cart and charger stations*
- mobile phone and camera battery chargers etc*.
- toasters, jugs and frying pans
- mobile electronic whiteboards
- AV equipment on trolleys
- portable heaters and air conditioners
- laboratory power supplies
- powered microscopes
- appliances that are often unplugged and stored away after use

*[Laptop charger stations](#) are to be connected to a power point that is protected by a safety switch. It is recommended that mobile phone, camera and [laptop chargers](#) are also protected by a safety switch when charging.

These items are not specified electrical equipment, are predominantly stationary and therefore the risk of damage and wear and tear is minimal. Testing and tagging is not required, however general care and maintenance is essential:

- personal desktop computers, routers and printers
- photocopiers and facsimile machines
- fixed electronic whiteboards
- television screens and projectors
- refrigerators, freezers and microwave ovens
- urns and wall mounted boilers
- water coolers
- air conditioners
- wall mounted heaters or fans
- washing machines and clothes dryers
- vending machines

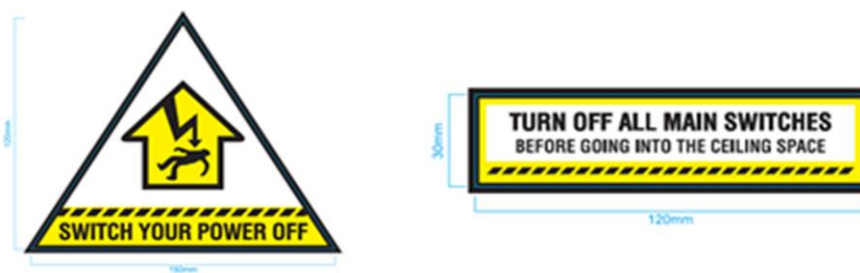
1.8 Can staff bring electrical items to school/workplaces?

Principals and managers have the discretion to allow staff to bring personal electrical items onto the school or work site. If electrical equipment is brought from home, it is to be managed the same way as electrical items owned by the department i.e. visually inspected before use, protected from damage and managed as per [section 1.4](#) and [1.6](#).

Some schools and workplaces implement additional processes such as requiring all items to be tested and tagged prior to them being brought to school.

1.9 Ceiling spaces

- Ceiling spaces pose serious electrical safety risks as contact can be made with live wires.
- **Department employees are not to access or enter ceiling spaces.** This includes to store, check, mend, or refurbish items or the structure.
- Appropriate contractors are to be engaged to undertake work in ceiling spaces.
- Ceiling entries must be labelled.
- A supply of labels can be provided by your Infrastructure Adviser.
- Labels are to be placed on personnel access panels.
- Tiled type ceilings require placement of at least one label in each room.



- Know the location of your main electricity supply. Ensure controls are in place for managing contractor access to switchboards and preventing unauthorised access to relevant switchboards.
- Department employees are not to remove any label, tag or lock out device whilst contractor is conducting electrical work
- Schools are to ensure any signage regarding the presence of solar panels is maintained - contractors to be aware of solar panels in use

Worksafe resources

- Electrical safety in ceiling spaces: <https://www.worksafe.qld.gov.au/injury-prevention-safety/electricity/homeowners-and-consumers/electrical-safety-in-ceiling-spaces>.

Keeping yourself and others safe around electricity

- **Never** do your own electrical work. **Always** get a licensed electrical worker to do any electrical work.
- Buy and use the right electrical equipment for the task.
- Use your appliance correctly. Follow the instructions.
- Be diligent with inspection and maintenance. Keep your appliances in safe working order.
- Disconnect broken appliances and have frayed cords or broken power points replaced.
- Keep electrical cords off the floor to reduce the risk of damage from drag or contact with sharp objects. A damaged electrical cord can cause a fatal electric shock.
- Don't mix water and electricity. Keep electrical appliances away from water and wet areas.
- Check the location of overhead wires and stand clear of any fallen power lines.
- Dial before you dig – phone 1100 or go to www.1100.com.au.

Part 2: Quick reference guide for specified electrical equipment – to be read in conjunction with Parts 1 and 3 of this guide

- Read each row to see if equipment needs protection through testing and tagging OR a safety switch OR both.
- Refer to who can undertake what activity in the table i.e. a competent person (C.P.) or licensed electrical worker.
- 'Double insulated' equipment is distinguished by the symbol of a box within a box and/or a 2 pin plug (not 3).
- Conduct a visual inspection before using any electrical equipment.
- If your school or work unit allows staff to bring electrical equipment from home a process is to be in place to ensure all items are managed according to this guide.

Location or Type of Electrical Equipment	Testing and Tagging Required?				AND/ OR	Safety Switch Required?							
	Testing and Tagging Frequency					FIXED (permanently installed) Safety Switch Testing Frequency		OR	PORTABLE Safety Switch Testing Frequency				
	Visual check of equipment	6mths (C.P.)	12mths (C.P.)	5yrs (C.P.)		6mth and 12mth	Conducted by a Licensed Electrical Worker as part of Service Maintenance Program		Daily (User)	3mths (User)	12mths (C.P.)		
ITD (Man Arts), Agricultural Studies, Schools Officer (S.O.) Shed - Double Insulated <input type="checkbox"/> Anything with a flexible cord e.g. hand-held drill/grinder.	Prior to use		✓		AND	✓	6 monthly - Test inbuilt test button and record results in service report 12 monthly - Test inbuilt test button and record results in service report and Inspect and test trip time and current and tag. Refer to s3.2.4.	OR	Must be fixed safety switch for S.O.'s shed	✓		✓	
ITD, Agricultural Studies, Schools Officer Shed - NOT Double Insulated Extension cord, power board and anything with a flexible cord e.g. drill press, lathe, bench grinder.	Prior to use	✓			AND	✓		OR	Must be fixed safety switch for S.O.'s shed	✓		✓	
Schools Officer work around school - Double Insulated <input type="checkbox"/> Anything with a flexible cord e.g. hand-held drill, circular saw (portable tools are usually double insulated).	Prior to use		✓		AND	✓		OR		✓		✓	
Schools Officer work around school - NOT Double Insulated Extension cord, power board.	Prior to use	✓			AND	✓		OR		✓		✓	
Home Ec, Catering, Kitchens, Tuckshops, Drama, Classrooms, Library, Science Laboratories Extension cord, power board and anything with a flexible cord that's <u>moved during use</u> e.g. hand mixer, iron, hot glue gun, hair dryer, engraver.	Prior to use		✓		OR	✓				When connected	✓		✓
Office, Admin areas, Staff rooms Extension cord, power board and anything with a flexible cord that's <u>moved during use</u> e.g. engraver.	Prior to use			✓	OR	✓				When connected	✓		✓ 2 yrs
Cleaning Equipment Extension cord, power board and anything with a flexible cord e.g. vacuums, polishers, scrubbers.	Daily visual check	✓			OR	✓			OR	✓	✓ Keep record		✓

Part 3: Maintaining electrical safety

3.1 What is testing and tagging of electrical equipment?

The Electrical Safety Regulation 2013 prescribes ways to ensure electrical safety. This includes the use of testing and tagging and/or safety switches.

'In-service testing and tagging' as the name suggests, involves a competent person ([section 3.3](#)) testing the electrical equipment to detect damage, wear or other conditions that may make it unsafe. The person must then label (tag) the item if it complies with the test specifications.

It is important to remember that testing and tagging can be rendered ineffective if any part of the electrical item is damaged after the tagging is completed. Implementing a testing and tagging regime is one method that the legislation offers as a way to ensure electrical safety.



The label (tag) attached to the item specifies the next test date.

Testing and tagging assesses the integrity of the item at the time of testing – it does not provide any 'extra' protection beyond that of the item's inbuilt safety features.

3.2 What is a safety switch?

Safety switches are also known as:

- residual current devices (RCD)
- earth leakage circuit breakers (ELCB)
- earth leakage devices (ELD).

Safety switches are easily identifiable by the 'T' TEST button (circled).

A range of devices are available:

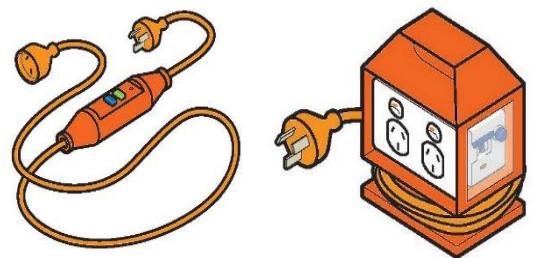
- fixed – permanently installed on electrical switch boards or on power points
- portable – connected to the relevant piece of equipment
- in-line – another portable option which is incorporated into a device similar to an extension lead.

How do safety switches work?

- Safety switches monitor and compare the current flow in both active and neutral circuits of an electrical item.
- An imbalance of current flow indicates that some of the current is not returning via the neutral wire but is leaking to earth – possibly via a person.
- When this occurs the unit detects the imbalance and automatically cuts the electrical supply to discontinue the flow of electricity in less than 1/30 of a heartbeat.
- This is sometimes referred to as the safety switch 'tripping'.



Example of fixed RCD fitted in power boards.



Examples of portable safety switches - a portable RCD fitted 'in line' to power cable (l) and a portable RCD protected power board (r). Image: Code of Practice Managing electrical risks in the workplace 2012. Safe Work Australia

Safety switches cannot protect a person if they contact both active and neutral conductors together. In this circumstance the current may not flow to earth and the safety switch would not detect an imbalance and therefore not 'trip' (cut off the electricity).

Complete protection under all circumstances is not possible from safety switches or any other devices. Proper care and maintenance of electrical equipment is always required.

The installation of a safety switch reduces the number of items that need to be tested and tagged as many items of electrical equipment can be protected by either testing and tagging or connection to a safety switch. For example, in an average primary school it is likely that the only specified electrical equipment that would need testing and tagging and connection to a safety switch would be electrical equipment used by the schools officer. Items in classrooms, library and office would be adequately protected by the safety switch.

What's so good about safety switches?

- Safety switches are designed to disconnect the power in less time than a heartbeat; thus possibly preventing a tragedy.
- Safety switches protect against shocks from current passing through the body to earth which is the most frequent cause of electrocution.
- A functioning safety switch provides an added level of ongoing protection.
- Testing and tagging checks the integrity of the item at the time of testing only. This can be rendered invalid if the item is damaged between checks.
- If electrical equipment is introduced into the school that is not electrically safe, a safety switch provides a level of protection and will assist with identifying faulty equipment.

The installation of safety switches provides ongoing savings due to reduced need for testing and tagging.

Fixed (permanently installed) safety switches are often confused with circuit breakers. Circuit breakers and fuses protect against overload faults and high current short circuits. Circuit breakers do not replace safety switches.

Safety switches protect people; circuit breakers protect equipment.



Main switch

Safety switch

Circuit breakers

Image source: Office of Industrial Relations

3.2.1 Why do safety switches need to be tested?

Nothing is failsafe. Safety switches must be checked regularly because, just like a smoke detector or any other safety device, it cannot protect you if it is not operating properly. All fixed and portable safety switches must be tested immediately after they are installed or connected and then regularly.

For frequency of each 'test' please refer to Part 1 of this document. A number of tests are undertaken through the Service Maintenance Program.

There are 2 types of tests for your safety switch:

- the 'user test'
 - for 'portable' and 'in line' safety switches is completed by someone at your school regularly activating the **TEST** button
 - for fixed (permanently installed) safety switches is undertaken every 6 months by a licensed electrical worker as part of the Service Maintenance Program
- the 'trip time and current test'
 - for fixed (permanently installed) safety switches is undertaken every 12 months by a licensed electrical worker as part of the Service Maintenance Program.

3.2.2 How do I perform the 'user' testing of safety switches using the TEST button?

The same process is used for fixed, portable and in line safety switches. Remember your regular testing of fixed safety switches is managed through the Service Maintenance Program.

1. Note: some electrical equipment may malfunction (e.g. lose data, start or stop unexpectedly) if the power supply is interrupted. Consider this equipment when planning your tests e.g. you may need to 'shut down' computers before pushing the **TEST** button.

2. Press the inbuilt **TEST** button – this simulates a problem in the system.

3. This should automatically 'engage', 'trip' or 'operate' the safety switch and cause it to flick to the **OFF** position.

4. Then simply press the **RESET** button.

5. If pressing the **TEST** button does not cause the safety switch to flick to **OFF** then call a licensed electrical worker immediately to have it checked. Seek advice from the licensed electrical worker on the use of the electrical items in the interim and note this advice. Higher risk items such as power tools in industrial technology should not be used until the switch is operating properly.

6. Record the date of the test on a register.



3.2.3 What do we do if the safety switch trips during normal activities?

1. If a safety switch trips and disconnects power, it may be due to a faulty appliance. You may have been using a faulty appliance or your electrical wiring may have become faulty.

2. Reset the safety switch by pressing the **RESET** button.

3. If it trips again, unplug the last appliance used. If everything works okay, label that item as faulty and arrange to have the item checked by an electrician.

4. If the safety switch continues to trip, disconnect all appliances on the circuit and plug them in, one at a time, until you locate the faulty one.

5. Avoid touching the appliances while carrying out this process.

6. Contact your licensed electrical worker if problems persist.

3.2.4 Who pays for testing and tagging and the installation of safety switches?

Testing and tagging of specified electrical equipment (school/workplace funded)

Schools and workplaces are responsible for engaging and funding contractors (or competent person) to complete testing and tagging of specified electrical equipment. There is no obligation for schools to engage BAS (formerly Q Build) to perform these functions.

Schools/workplaces should be mindful that competent persons who only 'test and tag' may be restricted in the types of electrical work they can perform and may not be able to complete repairs that may be needed to make the electrical equipment safe.

Schools can also liaise directly with electrical workers carrying out Service Maintenance Program electrical works about the potential to complete required testing and tagging activities if their schedule allows. Separate invoicing to the school and payment from school funding is required.

Testing of portable safety switches (school/workplace funded)

Schools are responsible for engaging and funding contractors (or competent persons) to undertake competent person testing of portable safety switches. As above, there is no obligation for schools/workplaces to engage BAS (formerly Q Build) to perform these functions. Be mindful of the scope of work that the person can conduct in terms of repairs.

Portable safety switches could be easily missed in testing regimes. Implement a system that works for your site, ensuring items that are used after hours are captured e.g. cleaner's portable safety switches.

Schools can also liaise directly with electrical workers carrying out Service Maintenance Program electrical works about the potential to complete required testing of all portable safety switches if their schedule allows. Separate invoicing to the school and payment from school funding is required.

Testing of fixed (permanently installed) safety switches (centrally funded)

Testing by a licensed electrical worker of fixed 'permanently installed safety switches is covered under the centrally managed and funded Service Maintenance Program. This work is managed by BAS and scheduled to occur every 6 months by a licensed electrical worker, which enables regulatory testing cycles to be met. Ensure the contractor provides written information about the testing conducted to enable records to be maintained at the school/workplace. This process may assist schools/workplaces identify circuits that do not currently have safety switch protection.

Schools should implement processes to enable all switchboards and areas of the school to be checked by the electrical worker to ensure all fixed safety switches are captured.

Testing of fixed electrical equipment (centrally funded)

Testing of some fixed, permanently wired electrical equipment is covered under the centrally managed and funded Service Maintenance Program according to regulatory requirements. This work is managed by BAS. Schools and workplaces should refer to the [Service Maintenance Program](#) to ensure all relevant items at the location are included. Ensure the electrical worker provides written information about the testing conducted to enable records to be maintained at the school/workplace.

3.3 Competent person

The Electrical Safety Regulation 2013 defines a competent person as someone 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. By choosing to complete testing and tagging 'in-house' the school (and in turn the department) takes on these responsibilities.

The principal or manager of the workplace is:

- responsible for determining that the person who carries out inspection, testing and tagging of electrical equipment has the required competencies; and

- accountable for the ongoing actions of the 'competent person'.

In the event of an electrical incident the following information may be requested from the school/workplace:

- documentation that the testing and tagging process was completed correctly;
- documentation or verification that the person fulfils the requirements of a competent person for testing and tagging; and
- information as to how this competency is maintained over time (refresher course, consistent use of the equipment, time allocation, confidence and competence in using the equipment).

Consequently, it is preferable to out-source this work to an appropriately qualified tradesperson. The licensed electrical worker (electrician) takes on the role of the 'competent person' and is responsible for ensuring the work completed is electrically safe.

A record of the work is to be retained by the school or workplace, providing evidence that the test and tag regime and visual checks are completed. If an electrical incident occurs, the principal can verify that testing and tagging was completed by a competent person by referring back to the contractor invoices/documents. In addition, appropriate actions such as repair or disablement can also be achieved. The skills to effectively achieve this may not be able to be acquired during a short course.

Course information

The competencies required to inspect, test and tag electrical equipment are stated in Australian Standard AS/NZS 3760 In-service safety inspection and testing of electrical equipment. These competencies as well as course information are listed on the [Electrical Safety Office website](#).

This link includes information on the course - 'UEENEEP026* Conduct In-service Safety Testing of electrical cord connected equipment' and Registered Training Organisations (RTO) that deliver the course.

3.4 New equipment

In Australia, when the equipment is new, the supplier is deemed responsible for the initial electrical safety of the new equipment. New equipment need not be inspected or tested, however, it must be included in the regime of testing and tagging (or used with a safety switch) as per other electrical equipment. This will ensure it is protected according to the type of work for which it is used and captured with the next 'round' of testing and tagging if appropriate.

3.5 Repaired equipment

Repairers of electrical equipment have a duty to ensure the repaired electrical equipment is electrically safe. This includes ensuring the repaired electrical equipment is tested and examined to verify it is electrically safe.

Repairers are not required to attach a 'test tag' to the repaired electrical equipment before returning it to the customer, however, the repairer is required to provide the customer with a 'certificate of testing and safety'. Any record containing the required information is acceptable as a 'certificate' and most electrical contractors include the information on the invoice or receipt. A copy of this invoice, receipt or document is to be kept by the workplace as verification of the safe management of the equipment (Ref: *Electrical Safety Act 2002, s37 and Electrical Safety Regulation 2013, s26*).

3.6 Three-phase equipment/hard wired equipment

Examples of equipment that use three-phase power in schools include lathes, milling machines, shapers, compressors, kilns and some large air conditioning systems.

The power available from a domestic power outlet in Australia is normally 240V A.C. The electricity available from these outlets is called single-phase power. This is a single voltage that alternates in polarity between positive and negative, hence the term 'A.C.' meaning Alternating Current. Figure 1 shows a typical A.C. voltage passing through the positive and negative stages of one cycle, which takes $\frac{1}{50}$ of a second to complete.

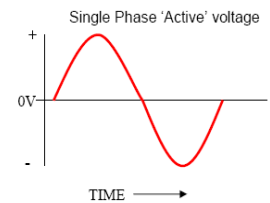


Figure 1: Single-phase A.C.

Most small domestic appliances use single-phase power because it is easy to work with and requires only two wires, active and neutral, (plus a protective earth wire) to deliver energy to a load. However, there are some limitations to single-phase power. As the voltage passes through a 'zero' point twice for each cycle, there are points in time when no energy is available to drive loads. This can be a problem for heavy and industrial loads which use a lot of power. Another problem is that single-phase electric motors do not know which way to rotate when they start, unless special wiring methods or motor-start devices are used.

Three-phase power is three simultaneous AC signals, spaced $\frac{1}{3}$ of a cycle apart in a single 50 Hz cycle (see figure 2). For industrial applications, three-phase motors are more reliable, less expensive, run more efficiently and last many years longer than their single-phase counterparts.

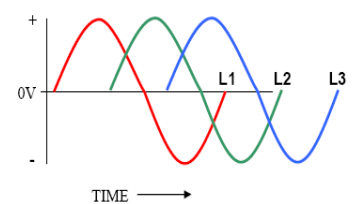


Figure 2: 3-phase power A.C.

These items are not 'specified electrical equipment' and are not covered under the requirements of the Electrical Safety Regulation 2013. However, it is important to ensure these items are used safely and the risk of electric shock is prevented or minimised.

Ensure that:

- the equipment is secured properly to the floor to prevent any damage to wiring or cabling due to slow movement or vibration of the equipment
- items are visually checked regularly for firm connections, damage to panels or wiring etc.
- regular checks by an electrician are also recommended.

Although unusual, three-phase, including hard wired equipment (no plug), can be connected to safety switches.

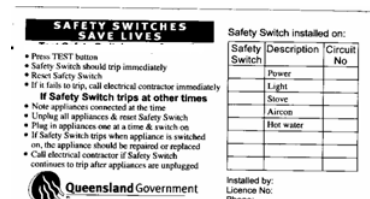
3.7 Record keeping

Records are essential to review how your systems are working and to monitor compliance with departmental and legislative requirements.

If an electrical incident occurs, records will be checked to determine if these requirements were fulfilled. Without records it will be difficult to demonstrate that systems were in place to ensure compliance. Internal auditors may also ask to check these records. The Australian/New Zealand Standard 3760 states that documentation must be kept for seven years.

There is a range of ways that you can create and maintain records – spreadsheets, electronic registers etc. Inclusion of the following information will support a range of functions in addition to your health and safety system including asset management, replacement programs, scheduling of testing and maintenance and budget planning.

1. Register of all electrical equipment
2. Specified electrical equipment:
 - identify and include frequency of testing and tagging dates (if required).
3. Safety switches e.g.:
 - record of 'user' and 'trip time and current test' testing for fixed 'permanently wired' safety switches in power boards by a licensed electrical worker as part of the Service Maintenance Program
 - the record can be as simple as a card in the switch board with date, name and signature



Example: testing register on sticker in a switch board

- as best practice – a record of the location of all safety switches and circuits they cover.
4. Repair or maintenance work e.g.:
 - a log where staff can identify repair work required for electrical equipment
 - service or maintenance work for specific items – an example form is available [here](#).
 5. Risk assessments related to the use of electrical equipment.
 6. Record, notify and investigate electrical incidents to prevent reoccurrence.

- ☞ Refer any person who receives an electric shock to medical attention, even if they say they feel fine.
- ☞ Notify all confirmed electric shock incidents to WHSQ on 1300 369 915.
- ☞ Record all electrical incidents in MyHR WHS – see the [Health, safety and wellbeing incident management procedure](#) for specific information.

3.8 How does electricity cause injury and electric shock?

Electricity is predictable in that it will:

- move in a circuit
- travel a path of least resistance
- head for the ground.

Electricity will not discriminate on how it achieves these three actions, that is, it will pass through a person to flow to the earth if that is the easiest path of travel. A safe path to ground for electricity is away from your body and confined within whatever piece of electrical equipment you are using. However, if an appliance is faulty the electric current may try to find another path (e.g. through a person) to get to ground.

Aside from injuries sustained due to electrical current flowing through the body, other injuries can result such as falls from ladders, contact with moving machinery or injuries to other people.

Electric shock has the potential to cause fatal injury. The term ‘electrocution’ implies death due to the action of electric current. Electric current passing through the body can cause:

- muscle spasms
- inhibition of the respiratory centre of the brain
- heart fibrillation (disturbance to heart beat)
- tissue burns and nerve damage
- confusion or memory loss.

Muscle spasm can prevent people from releasing their grasp on electrically ‘live’ parts and prevent breathing or shouting for help. This can cause the person to panic, which in turn induces sweating. A variable that affects current flow through the body is the individual’s ‘electrical resistance’. Almost all of the body’s resistance is in the skin and sweating further reduces the person’s inherent resistance (*greater resistance = increased difficulty for electricity to pass through the body*).



Ventricular fibrillation is considered the main form of death by electric shock. Essentially, it is a condition of the heart caused by the disturbance of the heart's own internal impulses. The heart rhythm fluctuates and cannot effectively pump blood to sustain life.

Isolate the person from the electric current if safe to do so (i.e. turn the power off if possible, remove the person from danger) and then provide first aid. Always seek further medical assistance either:

- immediately, by calling the ambulance
- as soon as possible, by attendance at a doctor even if the person has received a mild shock or only a suspected shock. This is because disturbance to the heartbeat may not be readily detected by the person or during first aid.

Further information

- [Creating healthier workplaces – electrical safety](#)
- [Health, safety and wellbeing incident management](#)
- [Workplace Health and Safety Queensland](#) website provides a range of safety tips.