

# **SafetyCARE** **Guidelines**

## **Electrical Lock Out Tag Out (LOTO) & Restoration of Power**



# Electrical Lock Out Tag Out (LOTO) & Restoration of Power

## What is our commitment?

To ensure that when Coles contractors, including appointed Principal Contractors, access plant or equipment for the purpose of undertaking installation, inspections or modification that all sources of electrical energy that have potential to cause injury to persons, damage to equipment or damage to the environment are effectively isolated.

This guideline covers all aspects of Coles operations, including construction.

## Risk Assessment

All electrical works conducted on Coles projects/sites must be preceded by the completion of a risk assessment by the electrical worker. Where the risk assessment process or legislative requirements determine that a safety observer is necessary for any work on or near exposed energised conductors or live conductive parts, then a safety observer should be organised by the electrical worker and be present during works.

## Permits to Work

The relevant brand permit and permit process must be observed at all times.

## Competency

Electrical work (whether energised or de-energised) must only be carried out by appropriately licensed or registered electrical workers. For more information about the applicable electrical licensing or registration laws contact the local State Electrical Nominee.

Lock Out procedures are to be known and understood by all electrical workers that are required to deploy them.

## Live Work

State and Territory electrical regulations recognise that there are a limited number of circumstances in which there may be a need to perform 'live work'.

Examples of live work are:

- Changing relays when energised
- Changing circuit breakers within switchboards while energised
- Modifying any live electrical control circuit conductor or conductors while energised
- Changing any switchgear while energised
- Replacing capacitors

'Live access work' (testing and fault finding) should be undertaken, where possible, in a de-energised environment using de-energised testing methods.

Live access work can be performed except in the following situations:

- Where a risk assessment has identified that live access work cannot be performed safely
- When working outdoors on live electrical equipment during periods of inclement weather e.g. rain, hail or electrical storms

## Key principles of Lock Out Tag Out (LOTO) – to be followed in all cases

Regardless of the energy type, it is mandatory for all lock outs to follow three common steps:

1. **Stop:** the source of energy to a lock out point is stopped, diverted or released prior to the actual lock out being performed
2. **Lock & Tag:** all lock out points will be secured to prevent the inadvertent de-isolation/re-energisation of the lock out point
3. **Test/Try:** this is testing for proof of positive isolation

The approved testing method is as follows:

1. Test between Active and Neutral
2. Test between Active and Earth
3. DISCONNECT AND SEPARATE ALL neutral conductors and test between each Neutral and Earth – this is to ensure no voltages are present due to crossed Neutrals being supplied by other circuits or switchboards.

Voltage testers are to be tested for correct operation immediately before use and again after use to confirm that the instrument is still working. This check should be part of the 'TEST BEFORE YOU TOUCH' safe work principle.

**Electrical Lock Out Tag Out (LOTO) & Restoration of Power**

May 2020

**Requirement to Isolate**

All electrical workers must isolate the potential danger, prevent others from operating the source by locking out the isolator, tag the switch or isolating device, and test to ensure it is safe prior to proceeding. All electrical workers will (where such exists) access and check on-site electrical drawings and schematics to confirm circuit and isolator details and locations prior to commencement. Electrical workers must ensure that the fuse switch or breaker that has been isolated by LOTO is correct. Isolating devices should be secured in the open position or zero energy state, in such a manner as to prevent inadvertent operation by the isolator.

**All potential energy sources must be isolated prior to commencement of any works.** This includes all sources of supply which may be fed from Centre Management or other external sources (e.g. sub- stations).

**No work is to take place if the electrical equipment to be accessed cannot be isolated appropriately.** Escalate to the Site Manager if you are unable to isolate all appropriate power sources.

**Securing the isolation**

Electrical workers must ensure when isolating electrical circuits or equipment, that the correct point of isolation is identified, an appropriate means of isolation is used, and the supply cannot be inadvertently re-energised while the work is carried out. A fundamental principle is that the point of isolation must be under the control of the person who is carrying out the work on the isolated conductors.

Tagging and locking systems must also be used at the point(s) of isolation. Tags must include the name of the person who has isolated the circuit, contact details, reasons for isolation and identified the circuit isolated.

**Special Note:** Cables are not to be removed from a point of supply as the method of temporary isolation, as this form of isolation cannot be adequately secured.

**LOTO Equipment Required**

Only hardware and devices specifically designed for electrical isolation and lock out are to be used. General household padlocks and the like must not be used for securing electrical isolation. The equipment outlined in the [Lock Out Tag Out \(LOTO\) Kit Contents](#) or equivalent is to be used as a minimum standard.



Example of compliant LOTO hardware



Example of non-compliant LOTO hardware



**Personal Red Locks & Personal Red Danger Tags**



Example of typical Personal Red Lock used for tag use for lock-out. Locks are individually keyed only



Example of typical Personal Red Danger tag use for lock-out

**Electrical Lock Out Tag Out (LOTO) & Restoration of Power**

May 2020

**Sharing of Personal Red Locks & Red Personal Danger Tags/Electrical Work Being Conducted by Multiple Electrical Workers**

Personal Red Locks and Personal Red Danger tags cannot be shared. Only the lock holder who affixes the Personal Red Lock and Personal Red Danger tag will be permitted to remove that Personal Red Lock and Personal Red Danger tag.

A specific procedure is available to cover extraordinary circumstances where removal of a Personal Red Lock or Personal Red Danger tag may need to be done by someone else other than the person who attached the lock out gear. Refer to **LOTO Removal Checklist**.

There will be one Personal Red Lock and Personal Red Danger tag affixed for every electrical worker working on a piece of plant or circuit. The use of one Personal Red Lock and/or Personal Red Danger tag to cover multiple electrical workers is not permitted. Multiple electrical workers are not permitted to work under one Personal Red Lock or to share keys. The deployment of an approved multi-lock hasp is required to be used.

The snapping of multiple Personal Red Locks onto another lock is not permitted, must only be affixed via a multi-lock hasp.

**Plastic Lock Out Hasp**



Lock out hasps may be of plastic (left) or steel (right) construction. They must not be made of aluminium.

**Steel Lock Out Hasp**



Completed Personal Red Danger tags are to be affixed to each Personal Red Lock for lock out. Personal Red Danger tags must be affixed to the Personal Red Lock by feeding the tag eyelet through the lock or affixed by use of a cable tie. The use of string to affix tags is generally not satisfactory as string can be tampered with or come away should a string tie knot come loose.

**Marking of Personal Red Locks & Personal Red Danger Tags**

All Personal Red Locks are to be marked with the details of the lock holder. This will be achieved by completion of the danger sticker that comes with the lock set, with a permanent marker pen.

Engraving the Personal Red Lock with the lock holder/electrical workers name and/or electrical licence number would also be acceptable.

**Out of Service Tags**

Yellow and black Out of Service tags are used to identify electrical equipment that is not safe to use or fit for purpose.

**Out of Service tags are not to be used whilst a circuit is being worked on.**

Any City team member or authorised Coles team member may affix an Out of Service tag to an item of plant deemed not fit for purpose or following an incident involving that item of plant.

The use of City and/or Partner Out of Service tags is permitted. A permit is not required for the use of Out of Service tags. The Out of Service tag should:

- be durable and securely attached
- clearly state the nature of the defect or reason why the electrical equipment is unsafe
- be attached on a prominent position on each isolation point
- only be removed by a competent person after fixing or rectifying the defect and making the electrical equipment safe, or replacing with a danger tag in preparation to work on the equipment
- be discarded and destroyed once the item of plant in question is discarded or repaired



**Isolating supply in Distribution Boards that cannot be secured with LOTO hardware affixed**

Due to the design of some distribution board cabinets some cabinet doors may not be able to be closed and/or locked within LOTO hardware affixed, when this circumstance is encountered the following guidance is provided on the appropriate method of isolation:

**Distribution boards in lockable plant room:**

- Fit the LOTO on the RCD and add isolation tag with electrician's details.
- Lock plant room door and advise SM of your work
- No unauthorised persons to be allowed in the plant room

**Distribution boards not in lockable plant room/BOH:**

- Isolate supply to entire distribution board
- Test to confirm isolation of distribution board
- Isolate RCD by removing wires from load side and terminating them with appropriate terminal connectors
- Add the LOTO isolation tag with electrician's details to the RCD
- Place LOTO Danger Tag on door of distribution board
- Close and lock door of distribution board
- Re-energise distribution board
- Advise the Site/Store Manager of the works

**NOTE:** Distribution board must be isolated prior to reinstating isolated RCD input wires.

**Leaving Unfinished Work**

If work is left unfinished, the workplace must be left in a safe state including, for example, by:

- terminating any exposed conductors
- physically securing any exposed conductors or surrounding metal work
- tagging, taping off the electrical equipment and the workplace area
- informing affected persons at the workplace the work is not complete and advising of potential hazards
- taking any necessary precautions to ensure that electrical equipment cannot become inadvertently re-energised
- ensuring that the status of switchboards and electrical equipment are clearly and correctly labelled
- handing over adequate information to workers taking up the unfinished work to allow them to continue the work safely

Any Personal Red Lock and/or Personal Red Danger tag that is left affixed with no electrical worker present or contact details available for the worker undertaking electrical work in the area can be deemed a breach of LOTO procedures. A full incident report and investigation will be required.

**Upon Leaving Site**

If the electrical worker is required to leave the site temporarily and will be contactable, the isolation lock and Danger tag may remain in place, provided the worker's name and contact details are clearly displayed. Switchboard and plant room doors must also be secured prior to leaving site.

If the work is incomplete, for example at a change of shift, the last person removes their danger tag and lock, leaves the workplace in a safe state and fits an Out of Service tag.

When work is resumed, the person in charge of the work completes a new isolation permit, removes the out of service tag and each person then applies their danger tag and/or lock.

When work is finally completed, each person removes their danger tag and/or lock.

**Personal Protective Equipment (PPE) & Lock Out Hardware Integrity**

All personnel must wear/use appropriate PPE for the task. This equipment is to be inspected prior to use by the electrical worker to ensure it is fit for purpose and maintained in accordance with relevant inspection programs.

PPE requirements for electrical work include but are not limited to:

- Wearing of full-face shield whilst undertaking live access work
- Mandatory rolling down and fastening of shirt sleeves.
- Removal of all conductive jewellery etc.
- Mandatory wearing of safety footwear as required and issued for electrical work.
- Wearing of rated electrical insulation gloves during live access work
- Deployment of insulated earth mats.

Personnel are not permitted to use LOTO gear that is not approved.

### Control Circuits or Control Systems

Control circuits or control systems such as emergency stops cannot be used as a means of isolation.

### Lock Out Removal & Power Restoration

Once the work is complete the lock holder will ensure the work site is clean and safe to return to normal operation.

The electrical worker will inform all relevant persons involved that it is safe to remove their Personal Red Locks and Personal Red Danger tags from each lock out point.

**Note:** The first electrical worker and lock holder who affixed the LOTO will be the last person to remove their Personal Red Lock and Personal Red Danger tags from each lock out point.



Example: Control switches not for lock out

On removal of the Personal Red Lock the electrical worker will advise all persons involved that lock outs have been removed. Precautions against inadvertent operation of other electrical equipment is to be considered prior to supply being restored.

All reasonable steps must be taken to ensure that restoring electricity supply following isolation does not pose risks to health and safety at the workplace. For example:

- appropriately terminating all conductors
- carrying out appropriate testing on any new, altered or repaired electrical equipment, for example tests for insulation resistance, earth continuity, polarity, correct connection and function testing
- removing safeguards, including temporary bonds and short-circuiting devices
- notifying all workers working on the electrical equipment and other affected workers at the workplace that electricity is to be restored
- taking precautions as appropriate to ensure that other electrical equipment is not inadvertently energised
- following procedures for removing any locks (or other control mechanisms), tags, notices and safety signs
- carrying out a visual inspection to ensure that all tools, surplus material and waste has been removed from the workplace.

When electricity is restored tests must be carried out to confirm that polarity is correct, actives are switched and, where applicable, phase sequences are correct before electrical equipment is used. For further information refer to *AS/NZS 3017:2007 Electrical installations – Verification guidelines*.

(Note: AS/NZS 3017 provides guidance on testing of low voltage electrical installations. It is recommended that the earth be connected first, followed by the neutral and the actives. See *AS 4741 Testing of Connections to Low Voltage Electricity Networks*.)

### Removal of LOTO by Any Other Electrical Worker Other than the Person who affixed the LOTO

No other person, other than a license electrician with an authorised work order is permitted to remove Personal Red Danger tags and Personal Red Locks. Any such act will be deemed a breach of this lock out procedure, and a serious incident will be logged and an investigation will take place and be led by the safety team or site manager in liaison with relevant maintenance team.

In the event of an electrical worker failing to remove their Personal Red Lock and Personal Red Danger tag prior to leaving the work area or site, and the equipment is required for return to service, the electrical worker will be contacted and where possible required to return to site to remove the lock and tag.

Where a person has not removed their Personal Red Danger Tag and Personal Red Lock and all reasonable efforts to contact them have been unsuccessful, or the person cannot return to work, then the Site Manager or person in charge of the site will contact the relevant Help Desk to escalate the issue as per normal process with the original job number. The Help Desk will organise for the appropriate qualified person to remove the tag/lock out after their procedures have been followed to ensure safety at the site by following LOTO Removal Checklist.

For **construction projects only** - Construction projects may require isolations to be in place for several days, in this case the permit should state the period of the time that the isolation is to be in place for. The appointed Construction Site Manager will organise for the appropriate qualified person to remove the tag/lock out after their procedures have been followed to ensure safety at the site by following LOTO Removal Checklist.

As a part of the resultant investigation, liaison with the relevant maintenance team should occur so the involved person can be contacted before they begin work on their next rostered shift or return to duty, and interviewed within an incident investigation context and be required to make a full statement as to why they failed to remove their lock out.

**Warnings**

Alternative sources of supply must also be identified and may include inverter/UPS systems, stand-by generators, solar cells, neutral back feed from intermixed circuits, ring main systems, mains power with separate auxiliary power supplies for control, transformation up (back feed from ELC controls) multiple control supplies and luminaries supplied from emergency sources or supply. This would extend to the possibility of circuit wiring of electrical equipment or conductors becoming energised due to any operation of automatic control devices, such as thermostats, switches, PLCs and other interface devices.



All other non-electrical sources of energy such as counterweight, stored hydraulic and pneumatic energy will be identified, isolated or secured to prevent unwanted release of energy from these potential sources.

All electrical conductors and parts including neutral and earthing conductors will be treated as energised until proven de-energised.



**Useful References**

Name	Available from
<a href="#">Coles Group Health Safety and Wellbeing Policy</a>	Connect
<a href="#">Coles SafetyCARE System Overview</a>	Connect
<a href="#">SafetyCARE Contractor Management Guideline</a>	Connect
<a href="#">SafetyCARE Hazard Management Guideline</a>	Connect
<a href="#">Coles High Risk Work Requirements</a>	Connect
<a href="#">Electrical and Gas Isolation Work Permit</a>	Connect
<a href="#">Electrical Contractors Safety Report (Electrical Exposure)</a>	Connect
<a href="#">Lock Out Tag Out (LOTO) Kit Contents</a>	Connect
<a href="#">Lock Out Tag Out (LOTO) Removal Checklist</a>	Connect
AS 4741 Testing of Connections to Low Voltage Electricity Networks	SAI Global
<a href="#">Coles Work Health and Safety Schedule</a>	Connect

**Version History**

Version	Date	Nature of amendment:
01	February 2018	Original version
02	September 2018	Removed reference to SafetyCARE Standards and aligned with the Coles SafetyCARE System Overview.
03	December 2018	New Coles Group template, updated Coles Group Health Safety and Wellbeing Policy, included reference to Coles High Risk Work Requirements
04	May 2020	Added detail to 'Securing the Isolation' section based on audit findings.

## Appendix 1: Lock Out Tag Out (LOTO) Definitions

Definition/Abbreviation	Explanation
<b>Electrical Work</b>	<p>Electrical work means the actual physical work of installing, maintaining, repairing, altering, removing or adding to an electrical installation or the supervising of that work.</p> <p>Electrical work does not include:</p> <ul style="list-style-type: none"> <li>• Work that involves connecting electrical equipment to an electricity supply by means of a flexible cord plug and socket outlet</li> <li>• Work on a non-electrical component of electrical equipment if the person carrying out the work is not exposed to an electrical risk</li> <li>• Replacing electrical equipment or a component of electrical equipment if that task can be safely performed by a person who does not have expertise in carrying out electrical work (e.g. replacing domestic fuses or light bulbs)</li> <li>• Building or repairing ducts, conduits or troughs where electrical wiring is or will be installed if: <ul style="list-style-type: none"> <li>○ the ducts, conduits or troughs are not intended to be earthed</li> <li>○ the wiring is not energised; and</li> <li>○ the work is supervised by a licensed or registered electrical worker</li> </ul> </li> <li>• Locating or mounting electrical equipment, or fixing electrical equipment in place, if this task is not performed in relation to the connection of electrical equipment to an electricity supply.</li> <li>• Assisting a licenced electrician to carry out electrical work if: <ul style="list-style-type: none"> <li>○ the assistant is directly supervised by the licensed electrician; and</li> <li>○ the assistance does not involve physical contact with any energised electrical equipment</li> </ul> </li> <li>• Carrying out electrical work, other than work on energised electrical equipment, in order to meet eligibility requirements in relation to becoming a licensed electrician</li> </ul>
<b>Electrical Worker</b>	A competent person performing electrical work.
<b>Energised</b>	Connected to a source of electrical supply or subject to hazardous induced or capacitive voltages.
<b>Exposed Conductive Part</b>	A conductive part of electrical equipment, which can be touched and which is normally not live, but which may become live under fault conditions.
<b>Live (energised)</b>	A term applied to part or all of an item of electrical equipment when a difference of potential exists between it and the mass of earth under normal conditions of operation.
<b>Live access work</b>	<p>'Live Access' means the access to electrical equipment while energised and includes fault finding, verification of de-energised equipment and visual inspections of energised equipment.</p> <p>Examples of live access are:</p> <ul style="list-style-type: none"> <li>• Fault finding live electrical equipment whilst energised</li> <li>• Testing electrical equipment for isolation</li> <li>• Commissioning of electrical equipment that has exposed parts</li> <li>• Taking voltage and current reading of equipment whilst energised</li> <li>• Adjustment of electrical switchgear and control equipment that exposes live parts</li> <li>• Thermal scans</li> <li>• Visual inspections</li> <li>• Opening of a door to motor control panels</li> <li>• Installation of electrical equipment, new Installations and field works</li> </ul>
<b>Live Work</b>	<p>'Live work' means electrical work performed in circumstances in which some, or all, of the electrical installation, or equipment being the subject of the electrical work, is energised at voltages above Extra Low Voltage. Extra Low Voltage means "an operating voltage not exceeding 50 V ac or 120 V dc ripple free".</p> <p>Live work is not to be performed by any contractor, except in a limited number of circumstances. For further information and examples of what constitutes live work, refer to 'Live Work'.</p>
<b>Lock Holder</b>	The primary electrical contractor who affixes a lock out item of hardware to an item of plant.
<b>Low Voltage (LV)</b>	Voltage exceeding 50 volts ac or 120 volts DC but not exceeding 1000 volts AC or 1500 volts DC.
<b>Safety Observer</b>	A person specifically assigned the duty by the electrical worker of observing and warning against unsafe approach to equipment and other potential hazards. This is particularly important when working near live exposed high voltage equipment.