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**1 What is Isolation?**

Isolation Procedures can also be called Lock-out, Tag-out or Barricading procedures.

Isolation procedures are used in two ways. Firstly Plant Isolation (Lock Out) involves the removal of the energy source from an item of equipment in such a way as to prevent the possibility of inadvertent energisation of the equipment. The de-energisation must also prevent the introduction of contaminants or conditions through equipment such as piping, ducts, vents, drains, conveyors, service pipes and fire protection equipment, into working areas defined as “confined spaces”. Isolation not only applies to electrical equipment but also any powered equipment.

The second form of isolation involves stopping people from entering a temporarily dangerous area.

Isolation procedures are an integral part of maintenance work and are an important part of [Safe Work Practices](#) and [Risk Management](#).

**2 When is Isolation necessary?**

Isolation may be required in the following situations:

- As a result of identifying faulty plant or equipment
- Before installation, commissioning or decommissioning
- Before carrying out maintenance, servicing, repair or cleaning on plant or equipment
- To stop entry into a temporarily hazardous area

**3 Scope**

This Standard applies to all persons affected when coming into contact with powered University plant and equipment at any stage of the plant life cycle. This includes plant and equipment powered by electricity, gas, air pressure, steam and any other form of stored or transmitted energy.

Where electrical equipment can be de-energised and isolated fully by unplugging from a power source the Defective Plant and Equipment Standard can be used.

## 4 Policy

When persons are working on or with plant/equipment or equipment Deakin University is required as far as is reasonably practicable to reduce the risk of injury by preventing plant, equipment or their components from being unintentionally set in motion or being re-energised during inspection, repair, maintenance or cleaning activities or at other times the plant/equipment is in use.

Operator controls shall be identified on the plant/equipment to indicate their nature and function. Where operator controls are within ready access by each person using the plant/equipment, they will be located and guarded to prevent unintentional activation and effective lock out of isolation points.

Except for simple electrical equipment connected via a plug and socket, only an appropriately licensed electrician shall isolate, disconnect and reconnect all electrical supply to an item of plant/ equipment/ equipment.

## 5 Responsibilities

The **Dean, Head of School, Director or unit head** is responsible for maintaining a safe system of work that includes isolation procedures. This includes:

- Providing adequate resources to ensure this Standard is implemented and adhered to.
- Ensure the safe systems of work are effective.

The **Manager / Supervisor** must ensure this Standard is implemented. The development and implementation (including training) of specific isolation procedures is the responsibility of the [line manager](#). This includes:

- An adequate budget for the supply or modification of equipment required to enable this Standard's implementation.
- Providing necessary training required to operate this work system.
- Allocating responsibility for the ongoing supply of tags and locks.
- Ensuring adequate supervision and that the safe systems of work are monitored and effective.
- Ensuring an adequate supply of tags and locks are readily available when required.
- Identifying equipment and situations requiring the use of this Standard. Arrange an evaluation of the need for redesign or modification to facilitate this Standard.

**Staff, contractors and students** using or undertaking installation, repair, service or maintenance work are responsible for following this Standard and/or local isolation procedures. This includes:

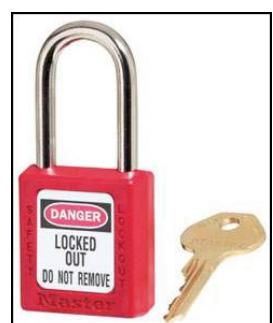
- Effective isolation and lockout is carried out to prevent injury and damage to themselves and other workers.
- The plant and the area is made safe on completion of the task and handed back to the responsible person.

All staff, visitors and students are expected to familiarise themselves with and comply with the isolation procedures that exist in their area of work. Failure to comply with an isolation procedure or signs can lead to disciplinary action or withdrawal of rights to carry out work in the area.

## 6 Definitions

**Line Manager** University manager or supervisor in charge of an operational area.  
Includes academic-in-charge where students are involved.

**Plant:** Plant is a general name for equipment and machinery that is not hand held.





**Lock out** Lockout involves the use of a key and locks system to prevent energy from being accidentally turned on or applied during equipment maintenance or repair. Energy may be applied from many sources. I.e. electrical, hydraulic, compressed air or coiled springs.

**Tag Out System** equipment/ energy source use or activation and warning of the

dangers associated with activating the equipment or energy source. It is used when equipment can't be locked out, and may also be applied in addition to a lock out as an additional danger alert. It may also be used to identify a faulty piece of equipment that must not be activated.

**Personal Danger Tag** A personal lock out tag is a red, white and black tag stating terms such as "DO NOT OPERATE" or 'DO NOT START'. It is attached to the personal lock indicating that plant is isolated and being worked on. It contains the name and contact details of the control person. The tag is a warning that operation of the equipment or energy source will endanger the person who attached the tag. It may only be removed by the tag owner.

**Equipment Out of Service Tag** An equipment out of service tag is a red, white and black tag stating terms such as "DO NOT OPERATE" or 'DO NOT START' that is used attached to the equipment indicating the plant is isolated when it is unattended. The tag is also a warning that the equipment is unsafe to energise or use. The tag may only be removed by the person identified on the tag.

**Caution Tag** is for applications where equipment may be operable but only under restricted conditions. The person placing it must write the conditions of restriction on the tag. This tag has a life of two months. Any person identifying a fault or a hazardous situation should apply the appropriate "Caution" tag. After applying a cautionary tag, report the hazard immediately. May be removed by appropriate service people, personnel, or supervisor after consultation and once machinery/equipment is deemed safe for repair and testing purposes.



**Lock Out Device** A lock out device locks out/ isolates energy sources and other hazards that could pose a risk to people working on the equipment. The lock out device shall incorporate a lock and accommodate one or more locks/ padlocks. A personal lock out device has one key and can only be opened by the person who attached it /has possession of the single key. Where multiple persons are working on the plant, a multiple lock out mechanism shall be used.

**Equipment Lockout** An equipment lock out system is used to prevent unauthorised access to or operation of equipment. It usually uses a generic key or access code. Key or code access is controlled.

**Lockout Station** This is a point at which the required lockout devices and tags are held. Each device has a unique key. Person's requiring a lockout device can obtain the required unit from this station. The use of a common station can save issuing each person with a range of lockout devices.

## 7 General Principles

To control hazardous energy, you have to prevent it from being transmitted from its source to the equipment that it powers. You can accomplish that by doing the following:

- Identify energy sources.
- De-energize equipment by isolating or blocking the energy sources.
- Dissipate potential (stored) energy that could affect the equipment.
- Lock out the equipment's energy-isolating device.
- Tag out the energy-isolating device only if you can't lock it out.

During a lockout/tagout situation:

- Never remove a lock or tagout without specific authorization of the person who applied it.
- Never turn on a machine during a lockout.
- Never activate a machine that has been tagged.
- Stay clear of locked or tagged machinery until you are notified that the power is back on.
- After a lockout, ensure all guards are back in place before operating equipment and all tools are removed from the machinery.
- Never bypass an engineering lockout or let a colleague do so.
- Never rely on engineering safety features.

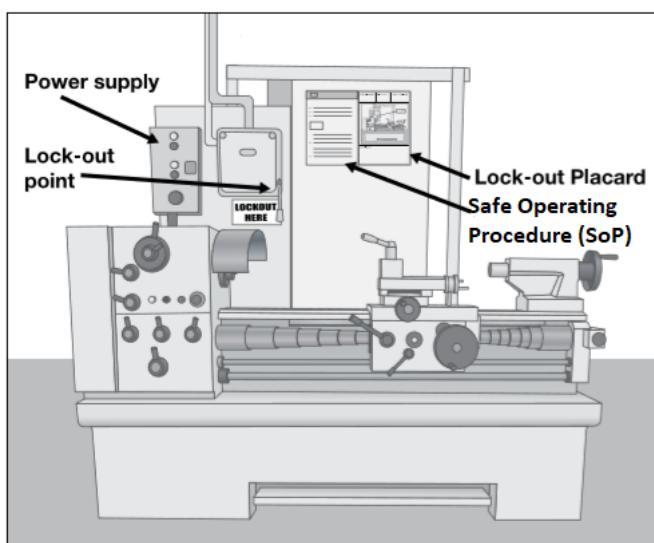
Only approved tags, (whether equipment or personal), in good condition are to be used. Tags which are damaged, have been altered or do not clearly show the required information are not permitted.

If you are uncertain with regard to any aspect of this Standard, whether it is required or whether the steps taken are adequate, TAG OUT the item and DO NOT ALLOW WORK TO COMMENCE. Contact your local Safety Officer or [Health Wellbeing and Safety](#) for assistance.

## 8 Developing local Isolation Procedures

The need for a local isolation procedure must be considered as part of the risk assessment for hazardous processes, plant, equipment or activities or where work may be carried out in hazardous locations.

### 8.1 Identify energy sources and controls



An energy isolation diagram that identifies energy sources, operating controls and isolation points shall be posted on the machine next to the safe operating procedure for reference by workers. These diagrams should be provided by the plant designer or installer, otherwise shall be developed by the university.

Lock out/tag out processes shall be used as a measure to control risk to lock out isolation points through the use of devices such as switches with built-in locks and lock-out circuit breakers. Lock out/tag out devices can be used in conjunction with interlocking systems, however are not to be used as an alternative to interlocking unless it is not reasonably practicable to use interlocking.

### 8.2 Safe operating procedure for plant/equipment or equipment isolation

Safe operating procedure shall include isolation. Local area safe operating procedures shall be available for plant or equipment that can be fully isolated by local physical separation from energy sources. These

procedures must include a requirement to identify and isolate energy sources prior to cleaning, servicing, repairing or alteration.

Safe operating procedures shall be documented and take into account:

- Shut-down of plant/equipment
- Identification of all energy sources, including uninterruptible power supplies (UPS) and generators
- Identifying all other hazards (for example, confined space entry, working at heights)
- Identifying all isolation points
- Isolating energy sources (including stored energy)
- De-energising all stored energy sources
- Confirm all energy sources are de-energised (including chocking, if required)
- Locking out all isolation points
- Tagging machinery controls, energy sources and other hazards
- Testing of isolation points to ensure the isolation procedure is effective by attempting to reactivate the plant/equipment or equipment to ensure that all stored energies have dissipated. This may require further measures to safely release these energies – e.g. for hydraulic or pneumatic pressure, suspended weight or compressed springs.
- Returning to service.

Prior to working on installation of plant/equipment, all authorised persons, including employees and contractors involved with the plant/equipment, shall be:

- fully informed, instructed and trained;
- can readily access safety information and procedures on plant isolation ,
- supervised to ensure isolation procedures are effectively applied.

## **9 Recommended Compliance Procedure**

<b>Methodology</b>	<b>Resources / Tools</b>
Step 1: Preparation	<p>The Isolation must:</p> <ul style="list-style-type: none"><li>• be carried out by the person(s) who will carry out the work on the plant</li><li>• involve a review of manufacturer or supplier's manual or working instructions (where applicable)</li><li>• if it involves multiple systems or people must be controlled by the one person</li><li>• For work involving a more than one party, each party must apply a separate tag or locking device for the group undertaking the work. In this case all parties must remove their own tags or locks on completion of the work.</li></ul>
Step 2: Identify all parts of any systems that need to be shut down.	<p>That is anything that supplies, transmits or stores energy.</p> <ul style="list-style-type: none"><li>• Identify and physically locate the switches, valves or other devices that need to be locked out.</li><li>• Identify the appropriate lockout/tag out system to be used.</li><li>• Advise relevant persons of your intended actions.</li></ul>

Methodology	Resources / Tools
Step 3: Locate all power sources	<p>Take any of the following steps that are necessary to guard against residual energy left in the equipment after it has been isolated from its energy sources.</p> <ul style="list-style-type: none"> <li>• Inspect the system to ensure all parts have stopped moving.</li> <li>• Relieve trapped pressure or voltage.</li> <li>• Release spring tension, or block the movement of spring-driven parts.</li> <li>• Block or brace parts that could fall because of gravity.</li> <li>• Block parts in hydraulic and pneumatic systems that could move from loss of pressure.</li> <li>• Drain process piping systems and close valves to prevent flow of hazardous materials.</li> <li>• Dissipate extreme cold or heat (wear protective clothing).</li> <li>• If stored energy can re-accumulate, monitor it to ensure it stays below hazardous levels.</li> </ul>
Step 4: Neutralise all power at its source	<ul style="list-style-type: none"> <li>• Be sure to isolate all energy sources, checking both main and secondary power supplies.</li> <li>• Disconnect electricity.</li> <li>• Never remove a fuse instead of disconnecting.</li> <li>• Block moveable parts.</li> <li>• Remove a supply section of pipe.</li> <li>• Drain or bleed hydraulic or pneumatic lines.</li> <li>• Lower suspended parts to rest position.</li> </ul>
Step 5: Lock out all power sources	<ul style="list-style-type: none"> <li>• Use a lock designed only for this purpose.</li> <li>• Each worker should have a personal lock.</li> <li>• Fill tags out completely and apply to lockout points.</li> </ul>
Step 6: Verify all equipment is isolated	<ul style="list-style-type: none"> <li>• Make sure all danger areas are clear of personnel.</li> <li>• Verify that the main disconnect switch, circuit breaker, activation point cannot be moved to the 'on' position.</li> <li>• Press all start buttons and other activating controls on the equipment itself to ensure the power doesn't go on.</li> <li>• Shut off all machine controls when the testing is finished.</li> </ul>
Step 7: Turn controls back to "off"	
Step 8: Perform necessary repairs or maintenance	<ul style="list-style-type: none"> <li>• Look ahead and avoid doing anything that could re-activate the equipment.</li> <li>• Don't bypass the lockout when installing new piping or wiring.</li> </ul>
Step 9: Removing lockout/tagout	<ul style="list-style-type: none"> <li>• After maintenance is finished, and before restarting equipment:</li> <li>• Reinstate all safeguards taken. (guards, pipes, wires)</li> <li>• Ensure all persons are accounted for and in a safe position while restoring energy.</li> <li>• Notify everyone who works in the area that lockout/tagout is being removed.</li> </ul> <p>Remove the lockout/tagout devices. Except in emergencies, each device must be removed by the person who applied and signed it.</p>

## 10 Training and Competency

Before a staff member or student is permitted to carry out the repair, cleaning, maintenance or servicing of plant they must demonstrate competency in carrying out isolations. The person must be familiar with isolation procedures and must be able demonstrate this competency in practice.

The competency of contractors is part of the contractor induction and management system.

The University person responsible for conducting this assessment is required to conduct this assessment on an individual basis with the participant. Records of training and participant's assessment are to be kept for a period of seven years.

## **11 Examples**

For a range of lockout / tagout equipment that is available see [www.cirlock.com.au](http://www.cirlock.com.au)

<b>Example</b>	<b>Isolation solution</b>
2 metre deep trench through common grassed area left unattended for extended period.	Use demountable fencing.
300 mm deep trench along side road way exposed for 2 days while kerbing work in progress.	Use plastic tape fencing supported by capped star pickets.
Removed concrete with exposed graded crushed rock.	Use plastic barrier tape supported by capped star pickets.
Work on an electrical circuit with remote switchboard.	Isolate circuit and lock switch out.
Work on electrical circuit where switchboard is behind locked cabinet away from public.	Isolate circuit and tag-out only is acceptable.

<b>DOCUMENT HISTORY</b>	
<b>Name of procedure</b>	<i>Hazard Isolation Standard</i>
<b>Overarching policy</b>	<i>Health Wellbeing and Safety policy</i>
<b>Original Date</b>	<i>10 December 2018</i>
<b>Review History</b>	<i>20 September 2019 Review and revision</i>
<b>Author</b>	<i>Michael O'Donoghue</i>