

California Institute of Technology

Lockout/Tagout Program



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PURPOSE

The purpose of the Lockout Tagout Program is to ensure that lockout tagout (LOTO) is implemented at Caltech to control hazardous energy in the workplace in compliance with [Cal/OSHA Title 8, California Code of Regulations \(CCR\), § 3314](#).

SCOPE

This written Program applies to the cleaning, repairing, servicing, setting up, and adjusting of machines and equipment in which the unexpected energization or start-up of the machines or equipment, or release of stored energy could cause injury to employees.

Cleaning, repairing, servicing, and adjusting activities shall include unjamming prime movers, machinery, and equipment. Procedures for servicing energized electrical systems are referenced in Caltech's [Campus Electrical Maintenance & Construction Safety Program](#).

Employees and contractors are required to comply with Caltech's Lockout Tagout Program.

RESPONSIBILITIES

Facilities Supervisors

- Ensure that all Authorized Employees have received training in the significance, purpose, and procedures of this Program.
- Each Authorized employee shall be instructed in the purpose and use of specific energy control procedure(s).
- Ensure that all Authorized Employees are provided with the proper LOTO and Personal Protective Equipment (PPE) to perform the job safely.
- Ensure that only Authorized Employees perform LOTO work.
- Ensure equipment-specific energy control procedures are written down and documented.
- Conduct or delegate annual energy control procedure inspections to evaluate their continued effectiveness and update as necessary.

Authorized Employees

- Review training in the significance, purpose, and procedures of this Program.
- Review equipment-specific LOTO procedures.
- Instruct each Affected Employees of the purpose and use of the energy control procedure.

Environmental Health and Safety

- Conduct periodic review of this Program.

DEFINITIONS

Affected Employee - An employee who is affected by the de-energization of machinery or equipment on which cleaning, repairing, servicing, setting-up, or adjusting operations are being performed under Lockout/Tagout, or whose job requires the employee to work in an area in which such activities are being performed under Lockout/Tagout.

Authorized Employee – A qualified person who locks out or tags out specific machines or equipment in order to perform cleaning, repairing, servicing, setting-up, and adjusting operations on that machine or equipment. An Affected Employee becomes an Authorized Employee when that employee’s duties include performing cleaning, repairing, servicing, setting up, or adjusting operations covered under this section.

Capable of Being Locked Out – An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if a lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

De-energized – Disconnected from all energy sources and not containing residual or stored energy.

Energized – Connected to an energy source or containing residual or stored energy.

Energy Isolating Device – Any mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. ***Push buttons, selector switches and other control circuit type devices are not energy isolating devices.***

Locked Out – The use of devices, positive methods and procedures, which will result in the effective isolation or securing of prime movers, machinery, and equipment from mechanical, hydraulic, pneumatic, chemical, electrical, thermal, or other hazardous energy sources.

Lockout Device – A device that utilizes a positive means such as an “individually keyed” lock to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Normal Production Operations – The utilization of a machine or equipment to perform its intended production function.

Prime Mover – The source of mechanical power for a machine.

Tagout – The placement of a tagout device on an energy-isolating device to indicate that the machinery or equipment being controlled cannot be operated until the tagout device is removed.

Tagout Device – A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

CLEANING, SERVICING, AND ADJUSTING OPERATIONS

- Machinery or equipment capable of movement shall be stopped and their power source(s) de-energized or disengaged.
- Accident prevention signs, tags, or both shall be placed on the controls of the power source(s) of the machinery or equipment.
- If necessary, the moveable parts must be mechanically blocked, in addition to being locked out to prevent inadvertent movement, or release of stored energy.
- If the machinery or equipment must remain on in order to perform a specific task, the use of extension tools or other methods minimizing the hazards to moving parts must be implemented. The employee must be trained in these methods.

REPAIR WORK AND SETTING-UP OPERATIONS

- Machines, equipment, or prime movers shall be locked out in the "OFF" position if they have lockable controls.
- If machines, equipment, or prime movers do not have lockable controls, they shall be de-energized or disconnected from their power source(s) (or other actions taken to effectively prevent the unexpected movement or release of stored energy).
- Accident prevention signs, tags, or both shall be placed on the controls of the power source(s) of the machinery or equipment.

EXCEPTIONS TO THE LOCKOUT/TAGOUT PROCEDURES:

- Minor tool changes and adjustments, and other minor servicing activities that take place during normal operations if they are routine, repetitive, and integral to the use of the equipment (e.g. changing a drill bit on a drill press, adjusting machine settings, etc.).
- Equipment that is isolated and made safe by simply unplugging an electrical cord, compressed air hose, or other single-source energy supply when the person working on the equipment has exclusive control over the connection to the energy source.

GENERAL HAZARDOUS ENERGY CONTROL PROCEDURES

These procedures apply to the cleaning, repairing, servicing, setting up, and adjusting of machines and equipment in which the unexpected energization or startup of the machine or equipment, or release of stored energy, could cause injury to employees.

Lockout/Tagout

1. Inform all Affected Employees that Lockout/Tagout work will be performed in their area. If appropriate, the Authorized Employee will request the Service Center issue a Utility and Service Interruption Notice.
2. The Authorized Employee shall check to make sure that no one is operating or using any machinery or equipment.
3. Access the energy-isolating device, such as a manually operated circuit breaker, and switch it to the "OFF" position.
 - *Important Note: Push buttons, selector switches, software controls, interlocks, and other control circuit devices are not considered energy-isolating devices.*
4. Lock out each of the energy-isolating devices with a lock, hasp, and an assigned individual warning tag showing the shutdown date. This may include unplugging the equipment and locking it out using an approved lockable cover on the electrical plug.
5. When placing a lock is not possible, an assigned individual warning tag must be used along with at least one additional safety measure for the purpose of disconnecting the machine or equipment.
 - This situation might happen on older machines or equipment with no lockable disconnect, valves or switches that don't accept a lock, or control circuits that do not isolate energy. Some examples include:
 1. A pneumatic line without a lockable valve.
 - i. **Solution:** Tag the valve and disconnect the airline and bleed off the pressure.
 2. Hydraulic equipment without a lockout point.
 - i. **Solution:** Tag the control and lower all stored energy and block/pin moving parts.
 3. Control circuit.
 - i. **Solution:** Tag the control panel and remove a control fuse.

Verification of Lockout

1. Isolate the immediate work area by vacating all unnecessary personnel.
2. Verify that all types of energy sources have been isolated or disconnected.
3. Test energy-isolating devices by trying to operate the machine or equipment using the normal operating controls (e.g., press the start button).
4. Once confirmed that the machinery or equipment is at a zero-energy state, work may begin.

Testing Energized Equipment during a Lockout/Tagout

In some instances, machinery or equipment must be energized during Lockout/Tagout work to tune, adjust, or make measurements before the machine or equipment is returned to service.

In these situations, an Authorized Employee must do the following:

1. Remove all unnecessary tools and equipment from the immediate work area.
2. Clear all unnecessary personnel from the immediate work area.
3. Remove the Lockout/Tagout device(s) and energize the machinery or equipment.
4. Make the necessary adjustments or measurements following safe and recommended procedures.

Steps to Re-energize Machines, Equipment, or Prime Movers

1. Reinstall, adjust, and secure all machine or equipment guards or guarding devices.
2. Remove all tools and parts from the immediate work area.
3. Isolate the immediate work area by vacating all unnecessary personnel.
4. Inform all Affected Employees in the immediate work area about the planned startup of the machine or equipment.
5. Remove all locks, hasps, and assigned individual warning tags or other energy- isolating devices.
6. Energize all energy sources.
7. Start machinery or equipment following normal operating procedures.

Group Lockout/Tagout

When the cleaning, repairing, servicing, setting up, and/or adjusting of machines and equipment is done by a group, they shall use the following group Lockout/Tagout procedures:

1. A primary authorized employee shall have responsibility for the employees working under the protection of the group Lockout/Tagout device by ensuring the following:
 - a. Be designated to isolate all energy from the machine(s) or equipment.
 - b. Control all affected work personnel to ensure Lockout/Tagout procedures are being followed.
 - c. Determine potential exposure to group members during the Lockout/Tagout process.
2. Department or group Lockout/Tagout devices shall be used following the procedures required in the [General Hazardous Energy Control Procedures](#).
3. Each Authorized Employee in the group shall attach a personal lockout device to a group lockbox or multi-lock hasp when they begin work and shall remove the lockout device at the end of their shift.

Shift or Personnel Changes

Departments or groups shall establish specific hazardous energy control procedures that will be used during shift or personnel changes to ensure the continuity of Lockout/Tagout protection between outgoing and incoming employees.

Specific Hazardous Energy Control Procedures

Separate departments or groups shall develop written procedural steps for each machine or piece of equipment affected by the hazardous energy control procedure.

The separate procedural steps may be grouped by type of machinery or equipment if one of the following conditions exists:

- Condition 1: The operational controls, locations of disconnect points, and steps to safely lockout the machinery or equipment are all configured in a similar manner.
- Condition 2: The machinery or equipment only has a single energy supply that is readily identified and isolated and has no stored or residual hazardous energy.

Removing an Authorized Employee's Lock

If an employee is unable to remove their Lockout/Tagout device due to not being at work, then the responsible Supervisor must make every attempt to contact the employee to return to work and unlock their Lockout/Tagout device.

If the employee cannot be contacted, or if it is confirmed that they are off-site and cannot return to work to remove their Lockout/Tagout device, the appropriate supervisor shall complete the "Authorized Lockout Device and Tag Removal Form" found in [Appendix A](#). Upon completing the form, the Supervisor may cut the lock or use a master key to remove it.

Upon return to work, the employee whose Lockout/Tagout device was removed must be notified and informed about the status of the machinery or equipment that was locked/tagged out.

Periodic Inspections

Periodic inspections of a department's Lockout/Tagout procedures will be performed at least annually to evaluate the effectiveness of the procedures and determine whether the procedures need to be updated.

1. The periodic inspections will be conducted by a Supervisor or an Authorized Employee, knowledgeable in Lockout/Tagout, who is not involved with the machine or equipment being utilized and inspected under the Lockout/Tagout procedures.
2. The periodic inspections will include a review between the inspector and Authorized Employee(s) of their responsibilities under the Lockout/Tagout procedures being inspected. The periodic inspection is provided in AiM as a work order phase. The inspection form can be found in [Appendix B](#).
3. The Authorized Employee or Supervisor performing the inspection will certify that the inspection has been performed. The inspection will include the following information:
 - a. The identification of the machine or equipment on which the Lockout/Tagout procedures are being utilized (asset number if available).
 - b. The date of the inspection.
 - c. The name(s) of the Authorized Employee(s) performing the Lockout/Tagout procedures during the inspection.
 - d. The name of the person performing the inspection.

TRAINING

The following employees will be trained in each of their respective roles. Re-training shall occur when new equipment or machinery is introduced, if there is a change in job assignment, or if the periodic inspection reveals deficiencies.

Authorized Employee:

Employees shall be trained in hazardous energy control procedures, and on the hazards related to performing activities required for cleaning, repairing, servicing, setting up, and adjusting of prime movers, machinery, and equipment.

Affected Employee:

Affected Employees shall be instructed in the following:

- Purpose and use of the Lockout/Tagout procedures.
- How to recognize Lockout/Tagout equipment.
- Prohibition on tampering with Lockout/Tagout equipment, including attempts to restart, or reenergize machines and/or equipment which are locked out or tagged out.

APPENDIX A: Lockout Device and Information Tag Removal Report

Employee Name:		UID#:
Department:	Contractor:	
Machine or Equipment:		
Date Lock and Tag Removed:		Time:
Reason for Removal of Lock and Tag:		

Was every reasonable attempt made to contact the employee? (Check the following):

- Verification was made that the employee was not in the facility.
- An attempt was made to contact the employee at home or elsewhere.
- The employee was given the choice of coming in immediately and removing the lock but refused.
- The employee could not be reached.
- The reason the lock and tag were installed has been determined.
- The status of the work performed has been determined.
- Other employees working on the machine or equipment have been consulted.
- Witness to the lock and tag removal

Other Comments: _____

Supervisor:

Name:	Signature:	Department:
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APPENDIX B: Periodic Lockout/Tagout Inspection Form

Directions:

- Conduct periodic inspections **at least annually**

Department/Shop:	Date:
Machine/Equipment Inspected:	

Employees included in the inspection:

1.	2.	3.
4.	5.	6.

Review the Lockout/Tagout Procedures and employee responsibilities with the Authorized Employees and complete the following:

1. Do the employees understand the Lockout/Tagout Procedures and their responsibilities under Caltech's Lockout/Tagout Program?

YES NO If no, indicate corrective action taken: _____

2. Do the employees follow the Lockout/Tagout Procedures?

YES NO If no, indicate corrective action taken: _____

3. Are the established Lockout/Tagout Procedures effective to provide full protection?

YES NO If no, indicate corrective action taken: _____

4. Other discrepancies noted and corrective actions taken: _____

Person Conducting Inspection:

Name:	Signature:	Department:
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