



Lockout / Tagout Safety Program

August 2021

Prepared by
The Ohio State University
Environmental Health and Safety
1314 Kinnear Road • Columbus OH 43212

614-292-1284
ehs.osu.edu



Table of Contents

1. Introduction..... 3

2. Responsibilities 3

 Environmental Health and Safety 3

 Supervisors 3

 Affected Employees 3

 Authorized Employees 3

 Contractors..... 4

3. Definitions 4

4. LOTO Applications and Exemptions 5

 Exemptions 5

 Lockout versus Tagout..... 5

5. Lockout/Tagout Devices 6

 Standardized Devices 6

 Lockout Devices..... 6

 Tagout Devices 8

6. Energy Control Procedures 8

 LOTO Procedure Steps 8

 Returning Equipment to Service 9

 Shift or Personnel Changes 10

7. Group LOTO Procedures 10

8. Tagout Procedures 10

9. Removal of LOTO Device in an Employee Absence 11

10. Training..... 11

 Authorized Employees 11

 Affected Employees 12

 Retraining..... 12

11. Periodic Inspections 12

Appendix A – Energy Source Determination 13

Appendix B – Periodic Evaluation and Certification Form 15



1. Introduction

To prevent death, injuries and property loss, all employees, students, contractors and visitors of The Ohio State University (Ohio State) must comply with the requirements of the Control of Hazardous Energy Standard (OSHA 29CFR 1910.147 and 1910.269), commonly referred to as Lockout/Tagout (LOTO) standards and this LOTO program.

This program establishes requirements for the lockout of energy-isolating devices. The intent is to ensure that equipment is de-energized and isolated from all potentially hazardous energy sources and locked out before employees perform service or maintenance tasks where the unexpected energizing, start-up, or release of stored energy could cause injury.

Authorized employees are required to perform LOTO in accordance with the policies and procedures established herein. All other, non-authorized employees observing equipment that is locked out shall not attempt to start-up, energize, use the equipment, tamper with, or remove a LOTO device. Failure to comply with the provisions of this program may result in corrective action, up to and including termination.

2. Responsibilities

Environmental Health and Safety

Environmental Health & Safety (EHS) updates and revisions to the written LOTO safety program and provides program oversight and a resource to implementing departments. EHS also provides online LOTO training and in-person training for authorized employees upon request.

Supervisors

Supervisors or department heads of areas where LOTO is utilized are responsible for the following:

- Conducting periodic evaluations of the LOTO program in place to ensure it meets all applicable requirements.
- Ensuring affected employees have been properly trained in all applicable areas of LOTO.
- Maintaining a list of authorized employees who may perform LOTO procedures.
- Providing sufficient locks and/or tags for the LOTO procedures being conducted.
- Developing equipment specific LOTO procedures for each type of equipment.
- Enforcing LOTO policy and ensuring corrective action is taken when training employees fail to follow LOTO procedures.

Affected Employees

Those employees who may work with equipment on which LOTO devices have the following responsibilities:

- Do not attempt to operate or energize any energy-isolating device that is under LOTO.
- Do not tamper with any lockout device or tag.
- Report any violations of this policy to their supervisor.
- Take assigned training to understand the procedures for LOTO.

Authorized Employees

Those employees who may be responsible for applying LOTO devices and working on de-energized equipment are responsible for the following:

- Properly identify and perform LOTO on all hazardous energy sources.



- Notify affected employees that LOTO activities will be conducted.
- Follow specific LOTO procedures for equipment and machinery.
- Report violations to their supervisor.
- Complete required LOTO training.

Contractors

Non-Ohio State personnel who are working on projects associated with Ohio State LOTO are responsible for the following:

- Awareness of this Ohio State LOTO safety program.
- Ensure project/building management is aware of any LOTO being performed as part of contractor work.
- Ensure contractor employees comply with all applicable OSHA LOTO requirements.

3. Definitions

Affected Employee - The employee whose job requires the operation or use of a machine or equipment on which servicing or maintenance is being performed under LOTO, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized Employee - An employee who has received the proper training and has been “authorized” by their department to apply LOTO devices when necessary to LOTO hazardous energy sources to perform service or maintenance.

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

Energy Source – Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, stored, or other energy.

Hazard – A source of possible injury or damage to health.

Lockout - The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, to ensure that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Box - A lockable storage box capable of securing keys to lockout devices.

Lockout Device - A device that utilizes a positive means such as a lock, either key or combination type, 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.

Lockout/Tagout – Specific practices and procedures to safeguard employees from the unexpected energizing or start-up of machinery and equipment or the release of hazardous energy during service or maintenance activities. Also referred to as LOTO.

LOTO, Group – Type of lockout procedure used for multiple workers, work groups, and/or work shifts.

LOTO, Individual - Type of lockout procedure used where one individual has total responsibility for the lockout and repair.



LOTO Release - Process of removing all locks, tags, and devices for the purpose of testing.

Servicing/Maintenance - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubricating, cleaning, or un-jamming machines or equipment and making adjustments or tool changes here the employee may be exposed to the unexpected energizing or release of hazardous energy.
Supervisor - Responsible person for the service group working on equipment when the group performing the service work is different from the owner/operator.

Tagout - The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy-isolating device and equipment being controlled may not be operated until the tagout device is removed. When tagout procedures are utilized, additional safety practices will be required such as removing fuses, etc. A tag is only a warning device.

4. LOTO Applications and Exemptions

All authorized employees shall follow LOTO procedures when service and maintenance tasks are performed on equipment and machinery where the unexpected start-up or energizing of the equipment or the unexpected release of stored energy could cause an injury or fatality.

Exemptions

This program does not apply to the following:

Hot Tapping: When a continuity of a vital service is absolutely essential, hot tap operations involving pressurized lines (steam, natural gas, etc.) may be completed without applying specific LOTO procedures. This exception may only occur when shutdown is not feasible and engineering analysis of the hot tap procedure has been completed. Only qualified personnel, provided with adequate protection, training and equipment may perform hot tapping.

Cord and plug equipment: LOTO procedures are not required in situations where the employee has complete control at all times of the cord and plug on electrical equipment and the accidental start-up or energizing is totally controlled by unplugging the equipment. The plug must be within reach of the employee at all times.

Lockout versus Tagout

When an energy-isolating device is capable of accepting a lock, a lockout shall be applied. An energy-isolating device is defined as a mechanical device that physically prevents the transmission or release of energy, including but not limited to 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 no pole can be operated independently; a line valve; a block; any similar device used to block or isolate energy. The term does not include push button, selector switch, or other control type devices.

Whenever there is replacement, renovation, repair or modification of a machine or equipment or when new machines or equipment are installed, energy-isolating devices for such machines or equipment shall be installed to allow the application of a lockout device.

When lockout devices are not feasible, tagout devices may be used provided authorized employees have been properly trained on their application

5. Lockout/Tagout Devices

Standardized Devices

LOTO devices must be standardized, identified as such, and used only for the LOTO program within the department. All other uses of LOTO devices are prohibited. Lockout and tagout devices shall indicate the identity of the employee applying the device(s). The lockout devices must be uniquely identified in at least one of the following criteria:





- Color
- Shape
- Size







In the case of tagout devices, print and format must be standardized.

Lockout Devices

LOTO devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected. The devices must be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as the use of bolt cutters or other metal cutting tools.

The following are examples of typical LOTO devices found in the workplace.

Cable Lockout	Circuit Breaker Lockout
	
Gas Cylinder Lockout	Group Lockout Box
	

<p style="text-align: center;">Valve Lockout</p> 	<p style="text-align: center;">Wall Switch Lockout</p> 
<p style="text-align: center;">Plug Lockout</p> 	<p style="text-align: center;">Lockout Hasp</p> 
<p style="text-align: center;">Lockout Padlock</p> 	<p style="text-align: center;">Tagout Tags</p> 



Tagout Devices

The following lists the design requirements for tagout devices:

- Tagout devices, including their means of attachment, must be substantial enough to prevent inadvertent or accidental removal.
- Tagout device attachment means must be non-reusable, attached by hand, self-locking and non-releasable with a minimum unlocking strength of not less than 50 pounds.
- Tagout device attachment means also need to have the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.
- Tagout devices shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.
- Tags shall not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored.
- Tagout devices shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: “Do Not Start” “Do Not Open” “Do Not Close” “Do Not Energize” “Do Not Operate”

6. Energy Control Procedures

Machine-specific procedures must be developed, documented, and utilized to control potentially hazardous energy. Procedures for equipment do not need to be documented when *all* of the following elements exist:

- 1) The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shutdown.
- 2) The machine or equipment has a single energy source which can be readily identified and isolated.
- 3) The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment.
- 4) The machine or equipment is isolated from that energy source and locked out during servicing or maintenance.
- 5) A single lockout device will achieve a locked-out condition.
- 6) The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance.
- 7) The servicing or maintenance does not create hazards for other employees.
- 8) No accidents involving the unexpected activation/energization of the machine or equipment during maintenance have occurred.

If there are specific LOTO procedures for equipment, obtain a copy and review procedures. If no equipment specific procedures exist, complete an energy source determination (Appendix A) and develop a machine or process-specific procedure. A template for this procedure can be found on the EHS website: <https://ehs.osu.edu/resources?title=lockout+tagout>

LOTO Procedure Steps

The following outline the steps required when conducting LOTO. These steps must be included in machine-specific energy control procedures.



- 1) Identify energy sources and isolating devices: Employees performing LOTO shall identify all sources of energy (Appendix A) and shall determine which switches, breakers, valves, or devices that isolate the equipment must be locked out as identified in the machine-specific procedure.
- 2) Notify all affected employees: The authorized employee(s) performing LOTO shall notify all affected personnel that the equipment is being de-energized and locked out.
- 3) Shut down the machine, equipment: The equipment shall be shutdown per normal operating procedures (depress the stop button, open switch, close valve, etc.).
- 4) Position the energy-isolating devices: The equipment shall be de-energized so that the machine or equipment is isolated from the energy source(s). This is accomplished by operating the appropriate switch, breaker, valve, or other device. Lockout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a "safe" or "off" position.
- 5) Apply LOTO: All energy-isolating devices (valves, breakers, switches, etc.) shall be locked out and tagged. A "Danger, Do Not Operate" tag shall be securely attached with the lock and shall possess the name of the person that applied the lockout and the date that it was applied.
- 6) Focus on residual or stored energy: Following isolation and lockout, and before any work begins, all stored or residual energy (such as that stored in capacitors, spring elevated machine members, rotating flywheels, hydraulic systems, air, gas, steam, water pressure, thermal energies, etc.) shall be dissipated and the equipment shall be reduced to a zero energy state. This may involve but is not limited to:
 - Discharging capacitors on electrical equipment.
 - Venting and drawing pressurized fluids and gases.
 - Cooling off hot equipment.
 - Blocking of all machinery components, which could move, rotate, or fall.
 - Attaching electrical grounding devices.If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is complete, or until the possibility of such accumulation no longer exists.
- 7) Verify isolation: Prior to verification, ensure that all personnel are clear from the area. Proceed in checking that the system or piece of equipment has been de-energized. This may be done by utilizing electrical testing instruments, visual inspection of vents and drains, or by attempting to operate the system or equipment from the normal control station.
- 8) Perform the repair or servicing task.

Returning Equipment to Service

When servicing and maintenance have been completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken:

- 1) Inspect the work area to be sure the equipment is fully assembled and operational.
- 2) Check to ensure that all remote controls are in the off or neutral position.
- 3) All devices positioned to dissipate stored energy are re-positioned as necessary for normal start-up.
- 4) Ensure the job site is secure and equipment is ready to be energized.
- 5) Ensure that all affected personnel are informed that the equipment is to be re-energized and are stationed at a safe location.
- 6) Remove the lockout devices(s) and tags and energize the equipment using normal operating procedures, after ensuring the equipment can be safely energized and that all personnel are clear.



Shift or Personnel Changes

Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees, to minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment, or the release of stored energy.

7. Group LOTO Procedures

Group LOTO is used whenever multiple repair workers and/or work shifts are involved.

When maintenance work is performed by contractors or by work groups different than the group that operates the equipment, information exchange must occur to ensure that all parties are aware of the LOTO status of equipment/machines.

Group LOTO follows all the requirements of individual LOTO procedures listed above in addition to:

- Assigning primary responsibility to an authorized employee for a set number of employees working under the protection of a group lockout or tagout device (such as an operations lock).
- Including a provision that allows an authorized employee to ascertain the exposure status of individual group members with regard to the lockout or tagout of the machine or equipment.
- Assigning overall job-associated LOTO responsibility to an authorized employee when more than one crew, craft, department, etc. is involved. This authorized employee coordinates affected work forces and ensures continuity of protection.
- Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

8. Tagout Procedures

Because of design characteristics of certain equipment, a lockout device is not always feasible. Whenever a tagout is independently used for the control of hazardous energy, the following steps shall be taken:

- The tagout must be accomplished by a completed LOTO procedure work plan, which states that a tagout will be used.
- Tagout must comply with basic LOTO procedures.
- Tags shall be affixed at the same location that a lock would have been attached.
- Tagout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a "safe" or "off" position.
- Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.
- Affected employees will be trained and made aware of the use of tags.
- It must be emphasized that tags are only warning devices.

Whenever tagout is used, additional safety precautions should be taken to isolate equipment and to prevent energizing the equipment. Acceptable methods of isolating equipment being tagged out include:

- Removal of an isolating circuit breaker.



- Blocking of a control switch.
- Opening a second disconnecting device.
- Removal of a valve handle.

A tagout shall only be used when the design of equipment or machinery makes it unfeasible to utilize a lockout device. Limitations of tagout devices include:

- Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.
- When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.
- Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective.
- Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.
- Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.
- Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

9. Removal of LOTO Device in an Employee Absence

Removal of a lockout device in the case of the employee who applied the device being absent:

- Verify the employee is not on the premises.
- Attempt to contact the employee to verify job/equipment status.
- Verify that the equipment can be safely energized.
- Record on the lockout form that the person's lockout device was removed.
- Inform the employee upon return that their lockout device was removed.

Each department/area will be responsible for adapting the steps above and implementing procedures for removing LOTO devices when the employee who applied the device is absent.

10. Training

Authorized Employees

Employees must receive training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees. The training shall include the following:

- Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.
- Each affected employee shall be instructed in the purpose and use of the energy control procedure.
- All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.
- When tagout systems are used, employees shall also be trained in the following limitations of tags.

EHS provides an online LOTO training on their website. This training can also be found on [BuckeyeLearn](#) by searching "Lockout / Tagout (LOTO)". A record of this online training is kept by EHS. Any additional, in person, training must be documented and kept by the employee's department.

Affected Employees

Affected Employees are those whose job requires the operation or use of a machine or equipment on which servicing or maintenance is being performed under LOTO. Training for affected employees shall include:

- Purpose and use of the LOTO procedures.
- How to recognize LOTO equipment.
- Prohibition on tampering with LOTO equipment.

Affected employees can also utilize the online training module available on the EHS website.

Retraining

Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.

Additional retraining shall also be conducted whenever a periodic inspection (Section 11) reveals, or whenever a supervisor has reason to believe that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.

Retraining reestablishes employee proficiency and is used to introduce new or revised control methods and procedures, as necessary. Supervisors shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

11. Periodic Inspections

A periodic inspection of the energy control procedure shall be conducted at least annually to ensure that the LOTO requirements are being followed. A template that can be used for this audit is found in Appendix B. The periodic inspection shall be performed by an authorized employee other than the ones(s) utilizing the energy control procedure being inspected. The periodic inspection shall be conducted to correct any deviations or inadequacies identified.

Where lockout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.

Where tagout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized and affected employee, of that employee's responsibilities under the energy control procedure being inspected, and of the limitations of tags.

Supervisors must certify that the periodic inspections have been performed. The certification shall identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.



Appendix A – Energy Source Determination

Energy Source Determination

To determine all energy sources for each piece of equipment, all questions must be answered. If the question does not apply, write N/A in the blank.

Date	Conducted by
Location	Work Center
Line	Equipment #
Equipment Name	Model
Procedure # Assigned	Serial #
List of Authorized Employees	

Energy Determination	Yes/No	Comments
Electric power greater than 50 volts? (Appendix B)		If YES, list Motor Control Center (MCC) or power panel and breaker number:
Lockout device for electric power?		
Battery power?		If YES, list location
Engine driven?		If YES, switch or key location
Lockout device for engine?		If NO, list method of preventing operation
Spring loaded?		
Is there a method of preventing spring activation?		If NO, how can spring tension be safely released or secured?
Counter weight(s)?		
Can counter weights be prevented from moving?		
Can counter weights be locked out?		If NO, how can it be secured?
Flywheel?		
Does flywheel have a method of preventing movement?		
Can flywheel be locked?		If NO, how can it be secured?
Hydraulic power?		If YES, location of main control/shutoff
Can control or shutoff for hydraulic be locked in OFF position?		If NO, location of closest manual shutoff valve
Does manual shutoff valve have lockout device?		If NO, what is needed to lock valve closed?
Is there a bleed or drain valve to reduce pressure to zero?		If NO, what will be required to bleed off pressure?
Pneumatic energy?		If YES, location of main control/shut off valve
Can control/shutoff valve be locked in "OFF" position?		If NO, location of closest manual shutoff valve



Energy Determination	Yes/No	Comments
Does manual shutoff valve have lockout device?		If NO, what is needed to lock valve closed?
Is there a bleed or drain valve to reduce pressure to zero?		If NO, what will be required to bleed off pressure?
Chemical system?		If YES, location of main control/shutoff valve.
Can control/shutoff valve be locked?		If NO, location of manual shutoff
Does manual shutoff valve have lockout device?		If NO, what is needed to lock valve closed?
Is there a bleed or drain valve to safely reduce system pressure and drain system of chemicals?		If NO, how can system be drained and neutralized? What PPE will be needed for this procedure?
Thermal energy?		If YES, location of closest manual shutoff valve
Can control/shutoff valve be locked in OFF or closed position?		If NO, location of closest manual shutoff valve.
Does manual shutoff valve have lockout device?		If NO, what is needed to lock valve closed?
Is there a bleed or drain valve to safely reduce system pressure and temperature and drain system?		If NO, how can system pressure and temperature be reduced and drained? What PPE or equipment is needed?
Are there any special precautions not mentioned in this table?		If YES, list them (i.e., fire hazards, chemical reactions, required cool down periods, etc.)

You can use the information on this document to develop a specific procedure that will protect the authorized employees who will be performing LOTO at your facility. Appendix C has a sample procedure form.

You can use the information on this document to develop a specific procedure that will protect the authorized employees who will be performing LOTO at your facility. A template for this procedure can be found on the EHS website:



Appendix B – Periodic Evaluation and Certification Form

Lockout/Tagout Periodic Evaluation and Certification Form

Authorized Employee(s) Being Evaluated:		
Item or Equipment:		
Location:		
Hazardous Energy Being Controlled:		
Name of Evaluator:		
Date Evaluation Conducted:		
EVALUATION OF HAZARDOUS ENERGY CONTROL PROCEDURES		
<i>Item Being Evaluated</i>	<i>Correct</i>	<i>Incorrect</i>
1. Lockout Procedure Work Plan Properly Executed		
2. Correct Energy Isolation Point Identified		
3. Affected Personnel Notified or Lockout/Tagout		
4. Machine, Device or System Properly Shut Down and Secured		
5. Energy-isolating device Properly Secured		
6. Energy-isolating device Properly Locked/Tagged Out		
7. Machine, Device or System is Properly Reduced to a Zero Energy State		
8. Lockout is Verified		
9. Work is Being Performed in a Safe Manner		
10. Review of employee responsibilities for Lockout/Tagout, and Lockout/Tagout procedure with employee		
Comments/Corrective Actions Taken:		
Lockout/Tagout Correctly Applied and is Certified by Evaluators	YES	NO

Evaluators Signature: _____ Title: _____