



**THE CONTROL OF HAZARDOUS ENERGY
LOCKOUT/TAGOUT
29 CFR 1910.147
Ursinus College
Collegeville, PA 19426**

This section establishes the **minimum** performance requirements for the control of energy sources (electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other) during servicing or maintenance of machines or equipment. Under the OSHA mandated program all employees will be protected from injuries caused by the **unexpected** start up or release of stored energy from machines or equipment. Locking out and tagging out energy isolating devices, and otherwise disabling machines or equipment to prevent unexpected energizing, start-up, or release of stored energy will accomplish this.

The program does not apply to work on cord and plug connected electrical equipment, to hot tap operations, or normal production operations.

DEFINITIONS:

Affected Employee: An employee whose job requires him/her to operate or use the machine or equipment on which the servicing or maintenance is being performed under the lockout or tagout or whose job requires performance of work in an area in which the lockout or tagout is in effect.

Authorized Employee: An employee qualified by training and authorized by the employer, who executes the lockout or tagout, in order to perform servicing or maintenance on that machine.

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 lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently alter its energy control capability.

Energized: Connected to an energy source or containing residual or stored energy

Energy Isolating Device: A 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, 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.**

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

Hot Tap: A procedure used in the repair, maintenance, and service activities that involve welding on a piece of equipment under pressure, in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without interruption of service for air, gas, water, and steam distribution systems.

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 energizing of a machine or equipment.

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 according to an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout is removed.

GENERAL ENERGY CONTROL PROCEDURE: (See Appendix A-LOCKOUT TAGOUT CHECKLIST)

This procedure establishes the minimum requirements for the lockout/tagout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall also be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before any employees perform any servicing or maintenance where unanticipated energization or start up of the machine or equipment or release of stored energy could cause injury. Ursinus College need not document the required procedure for a particular machine or equipment, when **all** of the following exist:



1. The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shutdown that should endanger employees (i.e., no capacitors to build up and store charge.)
2. The machine or equipment has a single energy source that can be readily identified and isolated.
3. The isolation and locking out of that single 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. There have been no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.

Most equipment at Ursinus College does not require specific written lockout/tagout procedures. In the event a specific written lockout/tagout procedure is required for work on a piece of equipment, the Operations Manager and Mechanics Supervisor will determine the procedure and review it with the employees performing the work.

A. *Sequence of Lockout/Tagout*

The eight steps listed below shall be followed for all lockout/tagout. For equipment with specific procedures, authorized employees should refer to these procedures to determine the specific information needed.

1. *Notify* all affected employees that servicing or maintenance is required and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.
2. The authorized employees must *identify* all energy/power sources for the machine or equipment, must understand the hazards of those energy/power sources, and must know how to control them.
3. If the machine or equipment is still operating, it should be *shut down* by the normal stopping procedures.
4. Operate the energy *isolating* device(s) so that the machine or equipment is isolated from the energy source(s). (i.e., open the circuit breaker)
5. *Lock out* the energy isolating device(s) with assigned individual lock(s) or lockout hasp and padlock and then tie a tag on the padlock. The tag must include the date and time of the initiation of the lockout and the worker's name and should be written in ink not pencil.
6. *Dissipate* or restrain stored or residual energy. (i.e., release pressure, block in position)



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7. Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, and then *verify the isolation* of the equipment by operating the controls or by testing to make certain that the equipment will not operate.

Please note: Return all operating controls to neutral or off position after verifying the isolation of the equipment.

8. The machine or equipment is now locked out.

Any equipment that requires a specific lockout procedure should be clearly identified in work orders. Supervisors will assure that, when necessary, specific procedures are available to employees and included with work orders. Questions concerning specific procedures should be referred to the Supervisor. If an employee is uncertain if a particular piece of equipment requires specific written procedures, he or she should check with the supervisor before starting work.

B. Compliance

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. Only authorized employees are permitted, and required, to perform lockout according to this procedure. No one has the authority to tag or lock machines/equipment for another employee. All employees, upon observing a machine or a piece of equipment that is locked out for servicing or maintenance, **must not** attempt to start, energize, or use that device. Failure to comply with this procedure will result in appropriate disciplinary action.

C. Restoring Machine/Equipment to Service

1. *Check the machine* or equipment and the immediate area to ensure that nonessential items have been removed, and that the machine or equipment components are operationally intact. Restore all equipment guards and other safety devices.
2. *Check the work area* to ensure that all employees have been safely positioned or removed from the area.
3. *Verify* that the controls are in neutral or off position.
4. *Remove the lockout/tagout devices* and re-energize the machine or equipment.
5. *Notify affected employees* that the servicing or maintenance has been completed and the machine or equipment is back in service.

D. Alternative Release From Lockout or Tagout

If the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of a supervisor provided that:

1. The supervisor has verified that the authorized employee who applied the device is not at the facility;
2. All reasonable efforts are made to contact the authorized employee to inform the person that the lockout or tagout device has been removed;



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3. The authorized employee is notified of the above before resuming work at the facility.

E. *Tagout:*

When energy isolation devices are not lockable, tagout devices may be used. The tag will be placed at the point of power initiation. When tagout is used, and the energy devices are lockable, full employee protection must be provided equivalent to that obtained by using a lockout device. In such cases, additional training and more rigorous periodic inspections are required.

If a tag is used without a lock on fixed electrical equipment, at least one additional safety measure must be provided such as removal of an isolating circuit element, blocking of a control switch, or opening an extra disconnecting device.

PROTECTIVE MATERIALS AND HARDWARE:

Authorized personnel (Mechanics) will carry locks and other LOTO devices in special LOTO toolboxes. In addition, Carpenters who are authorized to work on the woodworking machines may obtain the necessary locks and devices from the locksmith or supervisor. Chains for the lockout of valves will be available in Facilities. If you are unfamiliar with a piece of equipment and it needs repair, notify your supervisor.

Authorized personnel shall use a new LOCKOUT TAGOUT CHECKLIST and tag for each job. After the lock or tag has been applied, the checklist must be logged into the 3-ring binder labeled "Lockout/tagout Checklist" located in the EHS/Risk Manager's Office. When the lock or tag is removed, the date and time of removal shall be added to that checklist. The Facilities Supervisor and the Environmental Health and Safety/Risk Manager will inspect the checklists for completeness at regular intervals.

The lockout tagout padlocks shall be numbered or otherwise singularly identified, and must be the only authorized devices used for locking out and tagging energy sources. The spare key for each lock will be kept in the locksmith's office. Supervisors are the only personnel who will have access to these keys. The use of spare keys is limited to situations covered in this program. LOTO devices must not be used for other purposes and must meet the following requirements:

Durability: The device should be able to withstand the environment to which it is exposed for the duration of the procedure;

Standardized: The devices should be standardized in at least one of the following; color, shape, size, type or form;

Substantial: Lockout devices chosen should require excessive force (bolt cutters) to remove. Tagout devices and attachments should be chosen which will prevent inadvertent or accidental removal and be at least equivalent to a one piece all environment-tolerant nylon cable tie, non-reusable, hand attachable, self locking, non-releasable with a minimum unlocking strength of 50 pounds; and

Identifiable: Each lockout/tagout device shall indicate the identity of the authorized employee applying the device (stamped with unique numbers)



PERIODIC INSPECTION:

An inspection, at least annually, of each written energy control procedure must be performed by an authorized employee other than the one implementing the energy control procedure being inspected. The purpose of the inspection is to correct any deviation or inadequacies identified. Certification of these inspections will identify the machine or equipment, the date of inspection, the names of the employees included in the inspection, and the person performing the inspection.

TRAINING AND COMMUNICATION:

The Environmental Health and Safety Coordinator, or designee shall conduct general training sessions for all employees. The training will consist of a review of general procedures, a review of specific procedures for machinery, equipment and processes, location and use of special procedures and procedures when questions arise. Supervisors shall conduct training on specific written energy control procedures for authorized employees on specific machines and equipment. The supervisors will provide the required training records to the EH&S Coordinator to certify that employee training has been effected and is current. Retraining is required whenever there is a change in 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 training is also required when periodic inspection reveals, or whenever the supervisor has reason to believe, that there are deviations from, or inadequacies in the energy control procedures. The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

ADDITIONAL REQUIREMENTS:

A. Testing or positioning of machines

In situations in which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the device, the following sequence of actions shall be followed:

1. Clear the device of tools and materials.
2. Remove employees from the machine or equipment area.
3. Remove the lockout or tagout devices.
4. Energize and proceed with testing or positioning.
5. De-energize all systems and reapply energy control measures to continue the servicing and/or maintenance.

B. Outside Personnel (Contractors, etc.)

Whenever outside servicing personnel are to be engaged in activities covered by the scope of this program, Ursinus College (the Director of Facilities Services) and the outside contractor(s) shall inform the other of their respective LOTO procedures. The College shall ensure that our employees understand and comply with the restrictions and prohibitions of the contractors' energy control program.



C. *Group Lockout or Tagout*

When a crew, department, or other group uses lockout and tagout devices, one authorized employee (supervisor) is charged with the primary responsibility for a set number of employees working under the protection of a group lockout or tagout device. The authorized employee shall ascertain the exposure status of individual group members.

When more than one group is involved, the responsibility of the overall job associated with the lockout or tagout control shall be assigned to an authorized employee designated to coordinate affected work forces and to ensure the continuity of the project. Each authorized employee shall affix a personal lockout or tagout device to the group lockout device at the beginning of work, and shall remove those devices when he or she stops working on the machinery or equipment being serviced or maintained.

D. *Shift or Personnel Changes*

Specific procedures shall be developed for personnel changes to ensure the continuity of lockout or tagout protection. These include provisions for the orderly transfer of lockout or tagout device protection between employees and to minimize exposure to hazards from unexpected energization or start of the machine or equipment, or from the release of stored energy.

Classifications of equipment and machines, which must be locked and tagged including but not, limited to:

1. Heating, ventilation, refrigeration, and air conditioning equipment, including electrical heat.

If the device is not lockable at the machine/equipment, it must be locked out at the appropriate breaker panel.

2. Elevators

All are lockable. The lighting fixtures need not be tagged or locked, simply turn the circuit off at the wall switch.

3. Lighting and branch circuits

The majority will be locked and tagged at the breaker panel.

4. Miscellaneous

Dishwasher
Compactor
Scientific Instrumentation



LOCKOUT TAGOUT CHECKLIST

Authorized employees should perform lockout procedures in this sequence:

- Identify machine energy type, its hazards, and control devices.
 - Electrical
 - Gas, compressed air
 - Coiled springs
 - Raised load
 - Steam
 - Pressurized liquids
- Inform affected employees of planned lockout.
- Determine who has primary responsibility if service/maintenance is group assignment: who applies the first lock? Name of Group Leader (if applicable) _____
- Turn off machine or equipment.
- If energizing to test or position equipment, follow Lockout removal steps.
 - Relieve trapped pressure
 - Release tension on springs
 - Block or brace parts which could fall because of gravity or move due to loss of pressure.
 - Drain or block pipes: close valves
 - Dissipate extreme cold or heat
- Lock out energy controls (all members attach own locks during group service/maintenance).
- Test operating controls, then return to "off" position.
- Perform service/maintenance.
- If energizing to test or position equipment, follow lockout removal steps.
- Repeat lockout steps after test/positioning.
- Before re-energizing, remove tools; keep employees safely away from equipment.
- Reinstall machine guards.
- Remove lockout devices.
- Turn on energy and notify other employees.

Date & Time of Lock On _____

Date & Time of Lock Off _____

Location _____

Signature _____