

Standards of Practice

Lockout/Tagout (LOTO)

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ALERT: All employees must be able to identify and control electrical hazards associated with their assigned work environment. Fatal and nonfatal injuries can occur if exposed to energized electrical lines, damaged tools and equipment, inadequate wiring, overloaded circuits, exposed electrical parts, improper grounding, damaged insulation, and operating electrical equipment in wet areas.

Employees **shall not** work on electrical equipment unless the following circumstances have been met to be determined “normal” equipment condition:

1. The equipment is properly installed in accordance to the manufacturer recommendations and applicable industry codes and standards.
2. The equipment is properly maintained in accordance to the manufacturer recommendations and applicable industry codes and standards.
3. The equipment is properly used in accordance with the instructions included in the listing and labeling in accordance with manufacturer’s instructions.
4. Equipment doors are closed and secured.
5. Equipment covers are in place and secured.
6. There is no evidence of impending failure such as arcing, overheating, loose or bound equipment parts, visible damage, or deterioration.

7. The equipment is rated for available fault current. (NEW 2024)

If a normal condition is not met the employee must be trained and determined to be qualified in accordance with the NFPA 70 E guidelines and implement NFPA 70 E safe work practices. If not, contact an outside contractor to provide the necessary services.

I. PURPOSE

To establish Lockout/Tagout (LOTO) procedures that safeguard students, faculty and staff and contractors from the unexpected energizing or start- up of machinery and equipment, or the release of hazardous energy during service or maintenance activities.

II. SCOPE

This procedure applies to individuals, including affected students, faculty and staff and contractors, who assign, authorize or perform work on equipment that has an energy source that could be activated or released during service or maintenance activities.

III. CONSEQUENCES OF DEVIATION

The LOTO procedure serves as an essential element in identifying and managing energized sources impacting faculty, staff and students. Ignoring this procedure could result in serious injuries or fatalities.

IV. STANDARDS OF PRACTICE

Equipment that has the potential of being energized, activated or operated, during service or maintenance activities, shall be assessed prior to the start of work to ensure that all sources of energy and potential hazards are properly identified and secured in accordance with the procedure established by this procedure.

V. RESPONSIBILITIES

Department supervisors are responsible for implementing the requirements of this procedure, including, but not limited to:

- Perform assessments and develop written operating procedures that document specific procedural steps for performing LOTO.
- Maintain an inventory of equipment in their department that requires equipment specific standard operating procedures (SOP).
- Provide LOTO devices (tags, locks and/or any other hardware) for isolating, securing or blocking of machines or equipment.
- Identify affected/authorized employees and verify they receive LOTO training prior to performing work on equipment that requires LOTO.
- The supervisors shall continually monitor employee performance with regard to compliance with this procedure and shall correct any deviations or inadequacies observed. Supervisors shall perform initial and annual authorized employee lockout and tagout performance audit using the Energy Control Procedure located in this policy.
- When a machine or other equipment is replaced or repaired, renovated or modified, or newly installed, departments must ensure that it is designed and/or capable of accepting a LOTO device.
- At least annually, supervising departments shall conduct a review of their energy control program and update as required.

VI. REFERENCES

29 CFR 1910.147 *The Control of Hazardous Energy (Lock Out/Tag Out)*

ANSI Z-244.1-2003 *Safety Requirement for the Lock Out/Tag Out of Energy Sources*

NFPA 70E-2015 *Standard for Electrical Safety in the Workplace*

VII. DEFINITIONS

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

Authorized Employee: A qualified person who locks or implements a tagout system procedure on machines or equipment.

Capable of Being Locked Out: An energy isolating device which has a hasp or other means of attachment to which, or through which a lock can be affixed.

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 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. A mechanical device that physically prevents the transmission or release of energy.

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

Group LOTO: Used when a group of employees must repair or maintain equipment or machines.

Lockout:

The use of a padlock to lock the controls to an energy source in an "OFF" or "de-energized" position. **Lockout Device:** a unique device that utilizes a positive means such as a lock, either key or combination type, to hold an energy-isolating device in a safe position and prevent the energizing of a machine or equipment meeting the requirements of LOTO procedures.

Primary Authorized Employee: an authorized employee who has overall responsibility for meeting the requirements of LOTO procedures.

Qualified Person: a person designated by the department as having the training, knowledge and experience for that job function.

Servicing and/or Maintenance: workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming of machines or equipment and making adjustments to tool changes, where the employee may be exposed to startup of the equipment or release of hazardous energy. **Tagout:** the use of an identification tag placed on the padlock identifying the person working on the equipment and warning others not to start up the equipment.

Tagout Device: A prominent warning device, such as a tag and a means of attachment, which can be fastened securely 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.

VIII. ENERGY CONTROL PROCEDURES

Departments must develop, document and use specific procedures to control potentially hazardous energy when employees are servicing equipment or machinery.

Specific procedures are not required for a particular machine or equipment, when all of the following elements exist:

- The machine or equipment has no potential for stored or residual energy, or for re-accumulation of stored energy after shut down, which could endanger employees.
- The machine or equipment has a single energy source that can be readily identified and isolated and the isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment.
- The machine or equipment is isolated from that energy source and locked out during servicing or maintenance.
- A single lockout device will achieve a lockout condition.
- The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance.
- The servicing or maintenance does not create hazards for other employees.
- The department has had no accidents involving the unexpected activation or reenergizing of machines or equipment during servicing or maintenance.

Specific procedures, when required, shall include the following information:

- Purpose statement of the intended use of the procedure;
- Scope to identify the equipment involved;
- Specific procedural steps for shutting down, isolating blocking and securing machines or equipment to control hazardous energy;
- Specific procedural steps for the placement, removal and transfer of lockout devices or tagout devices and the responsibility for them; and
- Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures.

If electrical isolation is performed, a qualified person shall use test equipment (voltage meter) to verify that electrical power has been isolated from the equipment. This shall be performed using the Live-Dead-Live process (Note: this process is used to verify that the voltmeter is working properly before and after circuit voltage testing. It is accomplished by first checking a known energized "Live" circuit, then test the de-energized "Dead" circuit to be worked on, and lastly, the meter should be re-verified from a known source to ensure that it has not failed during the circuit confirmation process, hence the term "Live).

Departments may use the **Energy Control Procedure Template** (see attachments) to prepare specific departmental procedures.

Lockout/Tagout Sequence for: The following steps shall be incorporated into specific procedures and shall be used for LOTO of devices that do not require specific procedures.

- Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.
- Review the type and magnitude of the energy sources involved with this machine or equipment with affected employees.
- If the machine or equipment is operating, shut it down by normal stopping procedure (depress the stop button, open switch, close valve, etc.).
- De-activate the energy isolation device(s) so that the machine or equipment is isolated from the energy source(s).
- Place a lock and tag on the energy isolating device(s).
- Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.
- The machine or equipment is now locked out.

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

- Check the machine or equipment and the immediate area around the machine or equipment to ensure components are operationally intact.
- Check the work area to ensure that all employees have been safely positioned or removed from the area.
- Verify that the controls are in neutral.
- Remove the lockout devices and reenergize the machine or equipment. Note: The removal of some forms of blocking may require reenergization of the machine before safe removal.

- Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

Removal of LOTO Devices by Others: LOTO devices may only be removed by the individual that applied the device. Whenever work is being performed, under group LOTO, outside the normal shift or working hours a primary authorized employee must be present at all times. When changing shifts, the supervising department may, through an orderly transfer, designate a new primary authorized employee. This new primary authorized employee must attach their personal lockout device to the group lockout device or LOTO box before the previous authorized employee removes their lockout device.

Whenever work is being performed over a period of time and is not continuous, the primary authorized employee shall walk through the affected work area(s) to verify effective isolation protection prior to beginning work.

IX. OUTSIDE PERSONNEL (CONTRACTORS)

Whenever outside servicing personnel (contractors) are to be engaged in activities covered by the scope and application of this procedure, the supervising department and the outside employer shall inform each other of their respective LOTO procedures.

The supervising department shall ensure that his/her personnel understand and comply with restrictions and prohibitions of the outside employer's energy control procedures.

The supervising department shall ensure that all outside personnel have been properly trained in accordance to OSHA 29CFR 1910.147 "The Control of Hazardous Energy."

X. GROUP LOTO PROCEDURES

When servicing and or maintenance is performed by a crew, craft, department or other group, a procedure shall be utilized which affords the employees a level of protection equivalent to that provided by implementation of a personal LOTO device. Group lockout shall be utilized where complex LOTO operations involve many employees and numerous energy-isolating devices.

The primary authorized employee must implement and coordinate the LOTO of hazardous energy sources and verify that the steps taken, in accordance with the specific written energy control procedure, have in fact isolated the machine or equipment effectively from the hazardous sources.

This must be accomplished before authorized employees participating in the group LOTO affix their personal lockout device.

- Each authorized employee shall affix a personal LOTO device to the group lockout device, group lockbox, or comparable mechanism before he or she begins work, and shall remove those devices when he or she finishes working on the machine or equipment being serviced or maintained.

Shift or Personnel Changes: Whenever work is being performed under group LOTO, outside the normal shift or working hours a primary authorized employee must be present at all times. When changing shifts, the supervising department may, through an orderly transfer, designate a new primary authorized employee. This new primary authorized employee must attach their personal lockout device to the group lockout device or LOTO box before the previous authorized employee removes their lockout device.

Whenever work is being performed over a period of time and is not continuous, the primary authorized employee shall walk through the affected work area(s) to verify effective isolation protection prior to beginning work.

LOTO Devices shall be standardized in at least one of the following criteria: color, shape, or size: and additionally, for tagout devices print and format shall be standardized.

XI. TRAINING

- Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the types 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 program.
- All other employees whose work operations are or may be in the area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition of relating to attempt to restart or re-energize machines or equipment which are locked out or tagged out.

XII. RELATED ATTACHMENTS, FORMS OR DOCUMENTS

Appendix A: Protective Materials and Hardware

Appendix B: Examples of LOTO Devices

Energy Control Procedure Template

Revision Log			
REVISION DATE	REVISION NO.	REVISION AUTHORITY	NATURE OF REVISION
12.11.23	0	EH&S Coordinator	Date of Original Document Issuance

**Controlled documents are maintained electronically.
 Printed documents are UNCONTROLLED.
 Prior to relying on a printed document, verify that it is current.**

Appendix A

PROTECTIVE MATERIALS AND HARDWARE

LOTO devices must be standardized and singularly identified and the only device(s) used for controlling energy, and shall not be used for other purposes. In addition LOTO devices shall:

1. Be capable of withstanding the environment conditions to which they are exposed for the maximum period of time that exposure is expected.
2. Be standardized in at least one of the following criteria: color, shape, or size; and additionally, in the case of tagout devices, print and format shall be standardized.
3. Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolts cutters or other metal cutting tools.
4. Tagout devices including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal.
5. Tagout attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds having the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.
6. LOTO devices shall indicate the date installed and the identity of the employee(s) applying the device(s).
7. 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 Energize”, or Do Not Operate.”*

EXAMPLES OF LOTO DEVICES



Tag Out Devices



Group LOTO Box



LOTO Station

Energy Control Procedure

Name Equipment/Type:

Department:	
Prepared by:	Date:
Approved by:	Date:
Purpose	
To provide a safe procedure for lock out/tag out of machinery and equipment. This procedure shall protect faculty, staff and students from unexpected energizing or startup of the equipment, and/or the release of hazardous energy during service or maintenance of equipment.	
Scope	
This procedure shall be followed when performing service or maintenance on the following equipment.	
Building:	

Location:	
Equipment:	

Energy Sources/Hazards (Check all that apply and describe). Note: Energy Can Be Stored	
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			Electrical:
			Mechanical:
			Pressurized (hydraulic, pneumatic, other):
			Chemical:
			Thermal:
			Radiation (ionizing, non-ionizing):

Authorized Employees (Title)	
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The following employees are authorized to implement this procedure (add additional pages if needed).	
1.	5.
2.	6.
3.	7.
4.	8.

Lock out Tag out Steps	
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<input type="checkbox"/>	(1) Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.
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<input type="checkbox"/>	(2) Review the type and magnitude of the energy sources involved with this machine or equipment with affected employees.
<input type="checkbox"/>	(3) If the machine or equipment is operating, shut it down by normal stopping procedure.
<input type="checkbox"/>	(4) De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source.
<input type="checkbox"/>	(5) Ensure that the equipment is disconnected from the energy source by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other operating control to make certain the equipment will not operate. Note: A qualified person is a person designated by the employer as having the training, knowledge and experience for that job function.
<input type="checkbox"/>	(6)
<input type="checkbox"/>	(7)
<input type="checkbox"/>	(8) The machine or equipment is now locked out.

<input type="checkbox"/>	(9) In situations where the lock out or tag out devices must be temporarily removed from the energy isolating device and the machine/equipment energized to test or position the machine, equipment or component thereof, the employee must follow the following steps: •
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Procedure to Restore Equipment to Service	
<input type="checkbox"/>	When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken:
<input type="checkbox"/>	(1) Check the machine or equipment and the immediate area around the machine or equipment to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact. • Restore equipment to normal operating condition, with all normal safety precautions in place.
<input type="checkbox"/>	(2) Check the work area to ensure that all employees are safely positioned or removed from the area.
<input type="checkbox"/>	(3) Remove the lock out devices and reenergize the machine or equipment. Note: The removal of some forms of blocking may require reenergizing of the machine or equipment before safe removal.
<input type="checkbox"/>	(4) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.
<input type="checkbox"/>	(5) The machine or equipment is now back in service.