

Lockout/Tagout

This procedure establishes the requirements for lockout or tagout of energy isolating devices. It will be used to ensure that the machine or equipment is isolated from all potentially hazardous energy and locked out or tagged out before authorized employees perform any servicing or maintenance activities where the unexpected startup or release of stored energy could cause injury. Lockout/Tagout Procedure Form A (located in the appendix) for the control of hazardous energy for machinery and equipment is kept in supervisor's office.

Lockout/Tagout Policy

All equipment will be locked out or tagged out to protect against accidental or inadvertent operation when such operation could cause injury to personnel. Do not attempt to operate any switch, valve, or other energy-isolating device where it is locked out or tagged out.

Responsibility

The supervisor will instruct employees in the safety significance of the lockout and tagout procedure. Each new or transferred affected employee and other employees whose work operations are or may be in the area will be instructed in the purpose and use of the lockout or tagout procedure.

Compliance With This Program

All employees of Missouri University of Science & Technology are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment that is locked out to perform servicing or maintenance, should not attempt to start, energize or use that machine or equipment.

Preparation for Lockout or Tagout

The authorized employee will perform a survey to locate and identify all isolating devices to be certain which switch(s), valve(s), or other energy-isolating device apply to the equipment to be locked out or tagged out. More than one energy source (electrical, mechanical, or others) may be involved. Machine Specific Lockout Procedure Form B (in appendix) should be followed if available.

Lockout/Tagout Procedure

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.
2. The authorized employee will refer to the specific procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, will understand the hazards of the energy, and will know the methods to control the energy.
3. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open switch, close valve, etc.)
4. Engage the energy isolating device(s) so that the machine is isolated from the energy source(s).
5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Stored or residual energy (such as that in capacitors, springs, air, gas, steam, and water pressure, etc.) must be dissipated or bled down, etc.
7. 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.

CAUTION: Return operating control(s) to neutral or “off” position after verifying the isolation of the equipment.

8. The machine or equipment is now locked out.

How to Use a Tag System

When tagout systems are used, employees will also be trained in the following limitations of tags:

1. 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.
2. When a tag is attached to an energy isolating means, it is not to be removed without permission of the authorized person responsible for it, and is never to be bypassed, ignored or otherwise defeated.
3. 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.
4. Tags and their means of attachment must be made of materials that will withstand environmental conditions encountered in the workplace.
5. Tags may invoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.
6. Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

NOTE: After January 2, 1990, whenever replacement or major repair, renovation or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machine or equipment will be designed to accept a lockout device.

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 should be taken:

1. Check the machine or equipment and the immediate area around the machine or equipment to ensure that the nonessential items have been removed and that the machine or equipment components are operationally intact.

Restoring Equipment to Service

2. Check the work area to ensure that all employees have been safely positioned or removed from the area.
3. Verify the controls are in the off position.
4. Remove the lockout device(s) 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.
5. Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready to use.

Testing or Positioning of Machines, Equipment, and Components

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

1. Clear the machine or equipment of tools or materials.
2. Remove employees from the machine or equipment area.
3. Remove the lockout or tagout devices.
4. Energize and proceed with testing and positioning.
5. Deenergize all systems and reapply energy control measures in accordance with the requirements set forth in this instruction.

Procedure Involving More Than One Person

If more than one person is required to lockout or tagout equipment, each will place his/her own personal lockout or tagout device on the energy isolating device(s). As each person no longer needs to maintain his/her lockout/tagout protection, that person will remove his/her lockout/tagout device.

Lockout/Tagout Procedures: Exceptions

NOTE: Exception: No Specific Machine/Equipment Procedure is required for a particular machine or equipment, when all of the following elements exist:

1. The machine or equipment has no potential for stored or residual energy or accumulation of stored energy after shutdown which could endanger employees.
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 deenergize 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. In utilizing this exception, there have been no accidents involving the unexpected activation or reenergizing of the machine or equipment during servicing or maintenance.

Shift or Personnel Changes

In the case of shift or personnel changes, a change-over period will be established so that the authorized employees may exchange their assigned locks / tags. Authorized personnel assuming control of lockout equipment will be fully briefed in the scope and stage of the work by those being relieved.

Removal of Lockout/Tagout Devices by Other than the Authorized Employee

Lockout / Tagout devices will be removed from each energy isolating device by the employee who applied it except:

Lockout / Tagout devices may be removed by the authorized employee's supervisor only:

1. It is verified that the authorized employee who applied the device is not at the facility;
2. All reasonable efforts were made to contact the authorized employee to inform him/her that his/her lockout device has been or will be removed, and;
3. The authorized employee has this knowledge before he/she resumes work at that facility.

Accidents Concerning Lockout/Tagout

The immediate supervisor will be responsible for fully investigating all lockout / tagout accidents requiring medical attention and reporting to the Environmental Health & Safety Department.

Training and Communication

All authorized employees will receive training from their supervisor to ensure that the purpose and function of the energy control program are understood. Knowledge of safe application, usage and removal of energy controls is required by all employees. The training will include the following:

1. All employees will receive training in the recognition of applicable hazardous energy sources, type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

Training and Communication

2. Each affected employee will be instructed in the purpose and use of the energy control procedure.
3. All other employees whose work operations are or may be in an area where energy control procedures may be utilized, will be instructed about the procedure, and about prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

Employee Retraining

1. Retraining will 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.
2. Additional retraining will also be conducted whenever a periodic inspection, conducted at least annually, reveals, or whenever the supervisor has reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedure.
3. The retraining will reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

Training Roster

After all authorized personnel have been trained, the training document Form C (in the appendix) will be provided by the department supervisor. This document will contain each employee's printed name, employee number, the date, list of equipment, and the trainer's name. The Environmental Health and Safety Department (EHS) will maintain the training roster.

Periodic Inspections

Periodic inspections, Form D in the Appendix (at least annually) of the energy control procedure will be conducted by an authorized employee to determine the level of program compliance.

1. The periodic inspection will be designed to correct any deviation or inadequacies observed.
2. Where lockout is used for energy control, the periodic inspection will include a review with each authorized employee of that employee's responsibilities under the energy control procedure being inspected.
3. Where tagout is used for energy control, the periodic inspection will include a review with each authorized employee of that employee's responsibilities under the energy control procedure being inspected.

Glossary

Affected Employees—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/Tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed. An affected employee does not have the authority to Lockout/Tagout equipment.

Authorized Employees—A person who locks or tags out machines, equipment or power sources in order to perform servicing, installation or maintenance on the machine, equipment or system. An authorized employee through education, training and experience has developed this knowledge to do so.

Energy Isolating Device—A mechanical device that physically prevents the transmission or release of energy.

Energy Source—Any sources of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Lockout—The placement of a lockout device on an energy isolating device, in accordance with the established Specific Machine/Equipment Procedure, ensuring that the energy isolating device and the system or equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device—A device that utilizes a positive means such as a lock to hold an energy isolating device in a safe position. The identity of the person applying the device is required.

Tagout—The placement of a tagout device on an energy isolating device in accordance with the established procedure, to indicate that the energy isolated device and the system, equipment being controlled may not be operated until the tagout device is removed. The identity of the person applying the tagout is required. *A lockout device will be the first choice whenever possible.*

Appendix

LOCKOUT/TAGOUT PROCEDURE FORM A

Machine/Equipment Name: _____

Machine/Equipment Number: _____

This form must be attached to the machine/equipment during LO/TO

Authorization: Only employees trained in the Lockout/Tagout procedures for the above-named equipment, and having received training in the Lockout/Tagout procedure, may perform repairs or do maintenance on this equipment.

Energy Sources:

- | | | |
|---------------------------------------|----------------------------------|-----------------------------------------|
| <input type="checkbox"/> Electrical | <input type="checkbox"/> Thermal | <input type="checkbox"/> Compressed Air |
| <input type="checkbox"/> Hydraulic | <input type="checkbox"/> Stored | <input type="checkbox"/> Spring Tension |
| <input type="checkbox"/> Other: _____ | | |

Lockout/Tagout Procedure

- 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.
- The authorized employee will refer to the machine specific procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, will understand the hazards of the energy, and will know the methods to control the energy.
- If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open switch, close valve, etc.)
- Engage the energy isolating device(s) so that the machine is isolated from the energy source(s).
- Lock out the energy isolating device(s) with assigned individual lock(s).
- Stored or residual energy (such as that in capacitors, springs, air, gas, steam, and water pressure, etc.) must be dissipated or bled down, etc.
- 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.
CAUTION: Return operating control(s) to neutral or “off” position after verifying the isolation of the equipment.
- The machine or equipment is now locked out.

LOCKOUT/TAGOUT PROCEDURE FORM A

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 should be taken:

- Check the machine or equipment and the immediate area around the machine or equipment to ensure that the nonessential items have been removed and that the machine or equipment components are operationally intact.
- Check the work area to ensure that all employees have been safely positioned or removed from the area.
- Verify the controls are in the off position.
- Remove the lockout device(s) 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.

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

MACHINE SPECIFIC LOCKOUT PROCEDURE FORM B

Date: _____

Location: _____

Note: the following procedure is the machine specific lockout requirements developed for the machine listed below

Department: _____

Machine/Equipment: _____

Machine Number: _____

Energy Sources (check all that apply)

- | | | |
|-------------------------------------|-------------------------------------|-------------------------------------------|
| <input type="checkbox"/> Electrical | <input type="checkbox"/> Hydraulic | <input type="checkbox"/> Gravity |
| <input type="checkbox"/> Pneumatic | <input type="checkbox"/> Chemical | <input type="checkbox"/> Potential/Stored |
| <input type="checkbox"/> Thermal | <input type="checkbox"/> Mechanical | |

Method for Lockout

A. Shut down the equipment through Normal Procedures

B. Attach the lockout device(s)

1. Energy Source: _____
Isolation Device: _____
Located: _____

2. Energy Source: _____
Isolation Device: _____
Located: _____

3. Energy Source: _____
Isolation Device: _____
Located: _____

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EMPLOYEE LOCKOUT/TAGOUT TRAINING DOCUMENTATION FORM C

Employee Name: _____

The above-named employee has been trained as indicated below:

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/tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed. Affected Employee(s) will be informed of the procedure and instruction **not** to operated equipment/machine(s) locked or tagged out.

Authorized Employee—a person who locks out or tags out machine or equipment in order to perform servicing or maintenance on that machine or equipment.

Affected Employee

Date Trained

Authorized Employee

Signature of Trainer

Print Name of Trainer

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PERIODIC INSPECTIONS FORM D

Date of Review: _____

Authorized Employees Reviewed: _____

Machine Reviewed: _____

Type of Energy Control Procedure in Use:

Lockout Tagout

Does the employee(s) know his/her responsibilities under the Lockout/Tagout Program?

Yes No

If **NO**, describe the deficiency:

Is the employee following proper procedures when de-energizing the machine as described in the Lockout/Tagout Program?

Yes No

If **NO**, describe the deficiency:

Inspected by: _____

Supervisor must keep inspections on file and follow up on corrective action

LOCK OUT/TAG OUT GUIDELINES

The following guideline addresses the lock out/tag out (LOTO) procedure when more than one lock and/or more than one trade are involved in the LOTO.

If only one lock is needed or one trade is required to complete the work and to lock out/ isolate the single energy source while working on a piece of equipment then the written LOTO procedures does not need to be implemented. ***"Making sure all equipment to be worked on is safely locked out/isolated"***.

Beginning of the Job

Each person working on the piece of equipment will have his/her personal lock at the main point of isolation. The main point will almost always be electric.

1. The person assigned to perform the initial work will make the decision if the written LOTO procedure needs to be implemented.
2. If so, the LOTO checklist will be used to identify the areas to be locked out/isolated.
3. At this point affected persons (e.g., other crafts, supervisor, instrumentation, lab personnel etc.) should be informed of the item being locked out and the different energy sources identified needing to be locked out/isolated.
4. The initial person assigned to do the work will check out all the locks and devices needed to properly lock out the equipment.
The locks and devices are located at the LOTO station at Physical Facilities.
5. The "LOTO FORM" will be filled out identifying all energy sources locked out. The forms are located at the LOTO station.

End of the Job

6. Turn in all locks and devices to the LOTO station.
7. Inventory the lock out cabinet ensuring all locks/devices are accounted for.
8. Inform affected persons e.g. other crafts, supervisor, instrumentation, lab personnel etc. the job is complete.
9. Sign off on LOTO form that the LOTO has been removed.

Job Lasts longer than One Day

10. Each person will remove their personal lock located at the main power source (typically will be electric) at the end of the work day. Leaving the rest of the locks from the LOTO cabinet in place on the piece of equipment and locked until the required work is completed.