

Guide to Lockout/Tagout

29 CFR 1910.147

(Adopted from Fact Sheet by Ohio State University)

INTRODUCTION

The Control of Hazardous Energy Standard (29 CFR 1910.147), which is more commonly known as the Lockout/Tagout (LOTO) Standard, is a federal standard of the Occupational Safety and Health Administration (OSHA). It is designed to prevent employee injury caused from the unexpected startup of machines or equipment, or the release of hazardous energy while they are performing servicing or maintenance.

Approximately 39 million workers are protected by this rule. (The 3 million workers who actually service equipment face the greatest risk.) OSHA estimates that compliance with the standard prevents about 122 fatalities, 28,400 lost workday injuries, and 31,900 non-lost workday injuries each year.

The standard identifies the practices and procedures necessary to shutdown and lockout or tagout machines and equipment, requires that employees receive training in their role in the LOTO program, and mandates that periodic inspections be conducted to maintain or enhance the energy control program.

The lockout standard applies if:

1. The employee is required to remove or bypass a guard or other safety device.
2. The employee is required to place any body part into the equipment's point of operation.
3. An associated danger zone exists during a machine operating cycle that may cause employee injuries such as burns, lacerations, contusions or electrical shock.

Minor tool changes, adjustments, and other minor service activities, which take place during normal production, are not included in the LOTO Standard provided they are: 1) routine, repetitive, and integral to the use of the equipment, and 2) that they are performed using alternative measures which provide effective protection for the employee.

ENERGY SOURCES

Most people immediately think of electricity as a potentially hazardous energy source. However, there are other sources of energy that can be just as hazardous. These energy sources include thermal, chemical, pneumatic, hydraulic, mechanical, and gravity. It is important to remember that all sources of energy that have the potential to unexpectedly start-up, energize, or release must be identified and controlled before service or maintenance is performed.

WRITTEN LOCKOUT/TAGOUT PROGRAM

In order to comply, the employer must prepare a written LOTO Program which includes the following elements:

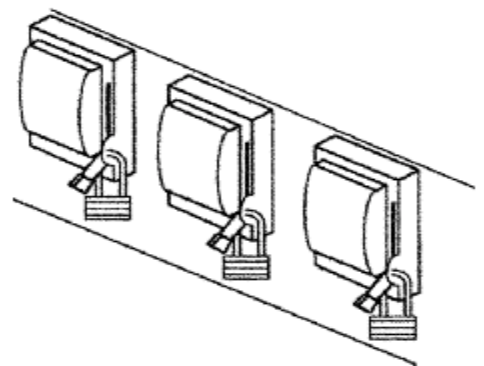
1. A specific statement as to the intended use of the program.
2. Clearly defined steps for shutting down, isolating, and blocking machinery and equipment in order to control hazardous energy.
3. Specific procedures for the placement and removal of LOTO devices as well as the method of identifying an individual's locks or tags. (*See sample program.*)
4. Requirements for verifying the effectiveness of the LOTO device by testing machinery and equipment after LOTO devices have been applied.
5. A detailed training program for employees who perform the service and maintenance and for employees who are affected by those operations.
6. Descriptions of company LOTO policies regarding outside personnel, shift changes, training of employees, and LOTO situations involving multiple employees.

EQUIPMENT

An audit should be conducted on all machines and equipment to identify all potentially dangerous energy sources and all energy isolating devices. By doing this, employers will be able to establish appropriate LOTO procedures and identify the necessary hardware required.

The basic equipment needed for a LOTO procedure are locks and/or tags. Locks are to be utilized whenever possible. Both locks and tags must clearly indicate the identity of the employee who applied the device. This provides positive identification as to who is servicing the machinery and equipment. The identification will also indicate who may not have finished working in a multiple LOTO situation.

The locks and tags must be durable enough to withstand the environment in which they will be used. Information on the locks and tags must remain legible. Locks must be substantial enough to prevent removal without the use of excessive force. Tags must be substantial enough to prevent accidental or inadvertent removal. Both locks and tags are to be standardized by color, shape, or size. Tags must have a standard print and format. If an energy isolating device is not capable of being locked out, a tag is to be used. (*An energy isolating device is simply a mechanical device that physically prevents the transmission or release of energy.*) An example of a lockable energy isolation device is an “electrical disconnect.”



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 must be designed to accept a lockout device.

EMPLOYEE CLASSIFICATION

Two types of personnel are defined by the LOTO Standard: **Affected Employees and Authorized Employees.** OSHA defines an Affected Employee as an employee whose job requires him to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout/tagout or whose job requires him to work in an area in which servicing or maintenance is being performed. OSHA defines an Authorized

Employee as an employee who locks out or tags out machines or equipment in order to perform servicing or maintenance.

STEPS IN A TYPICAL LOCKOUT/TAGOUT PROCEDURE

An actual LOTO procedure is simple and straightforward. There are two phases to the procedure.

Phase I – Application of Control

1. Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shutdown and locked out.
2. Identify the type(s) and magnitude of the energy that the machine or equipment utilizes, and the materials and methods necessary to control the energy.
3. Shutdown the machine or equipment with the normal stopping procedure.
4. De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).
5. Affix a personalized lock or tag on the energy isolating device(s).
6. Release stored or residual energy (*such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.*) by dissipating or restraining methods such as grounding, repositioning, blocking, bleeding down, etc.
7. Verify that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then check the isolation of the equipment by engaging the normal operating control(s) or by testing to make certain the equipment will not operate. (Then 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.



The image shows a rectangular lockout tag with a black border. At the top left is a warning symbol (exclamation mark in a triangle) and at the top right is a circle with a diagonal slash. Below these symbols, the text reads: "DANGER Safety Lockout Tag", "Do Not Operate!", "Tag Must Remain Intact Until Removed By Authorized Employee:", "Name: _____", "Date: _____", "Time: _____", "Maintenance Description: _____", and "Immediate Supervisor: _____".

Example of a Lockout Tag

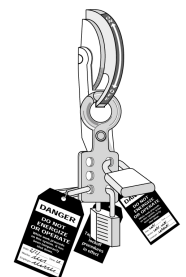
Phase II – Release from Control

1. Check the machine or equipment and the immediate area to ensure that nonessential items have been removed and that safeguards are operationally intact.
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 the “off” or neutral position.
4. Remove the lockout devices and reenergize the machine or equipment.
5. Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

These basic LOTO procedures are used when only one person is performing service or maintenance on machinery or equipment and when no testing or positioning of the equipment is required.

MULTIPLE LOCKOUT

In a multiple LOTO procedure, each person working on the machinery or equipment must place a lock or tag on the energy isolating device. If the energy isolating device will not accept multiple locks or tags, a hasp which accepts multiple locks should be utilized. The locks or tags must be placed in such a way that energy cannot be restored to the machinery or equipment until every lock or tag is removed. As each employee involved no longer needs to maintain LOTO protection, that employee removes their lock or tag. The employee attaching the lock or tag is the only person authorized to remove the lock or tag.



GROUP LOCKOUT

When servicing and/or maintenance is performed by a crew, craft, department or other large group, each authorized employee must affix a personal lockout or tagout device on a group lockout device or group lockbox when beginning work, and will remove those devices only when he or she stops working on the machine or equipment being serviced or maintained. Primary responsibility for a set number of employees (or crew) working under the protection of a group lockout, is vested in an authorized employee. Additionally, when more than one crew is involved, an authorized employee is designated and assigned to coordinate affected work forces and ensure continuity of protection.

TESTING AND POSITIONING

Before a machine can be placed in service, testing and positioning is sometimes required. The following procedure should be followed when testing or positioning machinery or equipment during service and maintenance:

1. The authorized employee makes certain that the work area is clear of tools and materials.
2. All affected employees are notified that the machinery or equipment will be positioned or tested.
3. All employees leave the area.
4. Locks or tags are removed.
5. The machine is started and tested or positioned.
6. When testing or positioning is complete, the machinery or equipment is de-energized following the proper LOTO procedure for servicing, or the machine is returned to production via the appropriate release procedure.

INSPECTIONS

Each LOTO procedure must be inspected or evaluated at least annually to insure the procedure is effective in controlling the energy for which it was designed. These inspections must be conducted by an authorized employee other than the employee who normally uses the machinery or equipment or performs the LOTO procedure. The inspection shall be conducted to correct any deviations or inadequacies identified. After each inspection, the employer must provide written documentation verifying that the inspection has been completed.

TRAINING

The employer shall provide training to ensure that the purpose and function of the LOTO program are understood by employees, and that employees can demonstrate the knowledge and skills required for the safe application, usage, and removal of the energy controls. Training must occur whenever there is a change in job assignment, a change in machinery or equipment, an energy control procedure change, or a change in a process that presents a new hazard.

When tagout systems are used, employees must also be trained in the limitations of tags, when locks are not employed. Retraining is to be conducted whenever the employer believes that employees' knowledge of the energy control procedures is inadequate and/or as a result of deficiencies found during periodic inspections.

Training shall also include the following:

- Authorized employees 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.
- Affected employees 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 LOTO procedures may be utilized, must be instructed of the procedure, and informed not to attempt to restart or reenergize machines or equipment which are locked out or tagged out.

OUTSIDE PERSONNEL

When outside personnel, such as contractors, are on site and engaged in activities that require compliance with the LOTO Standard, the on-site employer and the outside employer must inform one another of their respective LOTO procedures. It is the responsibility of the on-site employer to review the contractors program and if acceptable, ensure that their employees understand and comply with the methods of the contractors LOTO procedures. *(It is recommended that this issue be addressed prior to contracting services.)*

SHIFT CHANGES

A high percentage of accidents historically occur shortly after a shift change and are often due to a lack of communication. During a shift change, off-going personnel should meet oncoming personnel at the lockout/tagout device. The oncoming authorized employee should place his lock or tag on the energy isolating device before the off-going authorized employee removes his lock or tag. If this is not possible, it is recommended that a supervisor, oversee the process by placing their lock or tag on the energy isolating device, prior to the lock removal. This process ensures the continuity of the lockout at shift changes. In addition, off-going employees should inform oncoming employees of any problems or concerns regarding the service and maintenance of machinery or equipment.

LOCKOUT/TAGOUT DEVICES REMOVAL

Each lockout or tagout device shall be removed from the energy isolating device by the employee who applied the device. The only exception is when the authorized employee who applied the lockout or tagout device is not available to remove the device. In this event, the device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented and incorporated into the employer's energy control program. The employer shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized employee who applied it. The specific procedure shall include at least the following elements:

1. Verification by the employer that the authorized employee who applied the device is not at the facility.
2. Making all reasonable efforts to contact the authorized employee to inform him that his lockout or tagout device has been removed.
3. Ensuring that the authorized employee has this knowledge before he resumes work at that facility.

It is recommended that provisions be incorporated in the employer's lockout program to reduce the possibility of this occurrence.

LOCKOUT/TAGOUT CHECKLIST

The checklist below has been developed to assist in complying with the LOTO Standard:

- Audit all machinery and equipment for types and magnitudes of energy and potential hazards.
- Identify and document all machinery and equipment for which a LOTO procedure must be developed.
- Identify and document, by name and by job title, all affected employees.
- Identify and document, by name and by job title, all employees authorized to perform LOTO procedures.
- Describe and document types and locations of energy isolating devices for all machinery and equipment identified.
- Describe and document the types of energy involved and the methods to be used to dissipate or restrain the energy for all machinery and equipment identified.
- Describe and document the method established to isolate the energy (lock or tag) and any additional safety measures to be taken.
- Develop a written Lockout/Tagout Program.

SUMMARY

The Control of Hazardous Energy Source Standard requires employers to isolate machinery and equipment from its energy sources and to lock or tag them before service or maintenance is performed. The standard also requires that all employees be trained in the company's LOTO policies and procedures. Above all a successful program requires management leadership and employee participation.