

**LOCK OUT/TAG OUT
PROGRAM-
Control of Hazardous Energy**

University of Dayton

**Reference
29 CFR 1910.147**

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Approved by:
Robin Oldfield
Director, Environmental Health & Safety/Risk Management
University Of Dayton
300 College Park, Dayton, Ohio 45469-2905
Phone 937-229-4503 Fax 937-229-4395

Table of Contents

| | | |
|-------|---|----|
| I. | General..... | 3 |
| II. | Purpose..... | 3 |
| III. | Responsibility..... | 3 |
| IV. | Full Employee Protection..... | 3 |
| V. | Definitions..... | 4 |
| VI. | Preparation for Lockout or Tagout..... | 5 |
| VII. | Sequence of Lockout or Tagout System Procedures..... | 5 |
| VIII. | Restoring Machines or Equipment to Normal Operation..... | 6 |
| IX. | Procedure Involving More Than One Person..... | 6 |
| X. | Basic Rules for Using Lockout or Tagout System Procedure..... | 6 |
| XI. | Safety Lock Removal..... | 6 |
| XII. | Non-University Employees – Contractors..... | 6 |
| XIII. | Training..... | 7 |
| | Appendix A- OSHA Fact Sheet 89-32..... | 8 |
| | Appendix B- 29 CFR 1910.147..... | 15 |
| | Appendix C- Safety Lock Removal Form..... | 16 |

I. General

The OSHA standard for The Control of Hazardous Energy (Lockout/Tagout), Title 29 Code of Federal Regulations (CFR) Part 1910.147, addresses the practices and procedures necessary to disable machinery or equipment, thereby preventing the release of hazardous energy while employees perform servicing and maintenance activities. The standard outlines measures for controlling hazardous energies—electrical, mechanical, hydraulic, pneumatic, chemical, thermal, and other energy sources. In addition, 29 CFR 1910.333 sets forth requirements to protect employees working on electric circuits and equipment. This section requires workers to use safe work practices, including lockout and tagging procedures. These provisions apply when employees are exposed to electrical hazards while working on, near, or with conductors or systems that use electric energy.

II. Purpose

This procedure program establishes the minimum requirements for the lockout/tagout of energy isolating devices. It shall be used to ensure that the machine or equipment are isolated from all potentially hazardous energy, and locked out and tagged out before employees perform any servicing or maintenance activities where the unexpected energization, start-up or release of stored energy could cause injury.

III. Responsibility

Employees shall be instructed in the safety significance of the University's lockout/tagout procedure. Each new or transferred affected employee and other employees whose work operations are or may be in the area shall be instructed in the purpose and use of the lockout/tagout procedure (names(s)/Job Title (s) of affected employees and how to notify).

IV. Full Employee Protection

When a tagout device is used on an energy isolating device which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached, and the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program.

In demonstrating that a level of safety is achieved in the tagout program which is equivalent to the level of safety obtained by using a lockout program, the employer shall demonstrate full compliance with all tagout-related provisions of this standard together with such additional elements as are necessary to provide the equivalent safety available from the use of a lockout device. Additional means to be considered as part of the demonstration of full employee protection shall include the implementation of additional safety measures such as the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or the removal of a valve handle to reduce the likelihood of inadvertent energization.

V.

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 person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

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 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.

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

Hot tap. A procedure used in the repair, maintenance and services activities which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Lockout. The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the 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, 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.

Normal production operations. The utilization of a machine or equipment to perform its intended production 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 unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the **unexpected** energization or startup of the equipment or release of hazardous energy.

Setting up. Any work performed to prepare a machine or equipment to perform its normal production operation.

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 the equipment being controlled may not be operated until the tagout device is removed.

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 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.

VI. Preparation for Lockout/Tagout

Make a survey to locate and identify all isolating devices to be certain which switch (s), valves (s), or other energy isolating devices apply to the equipment to be locked and tagged out. More than one energy source (electrical, mechanical, or others) may be involved (Type (s) and Location (s) of energy isolating means).

VII. Sequence of Lockout/Tagout System Procedure

1. Notify all affected employees that a lockout/tagout system is going to be utilized and the reason for the lockout/tagout. The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the hazards thereof.
2. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open toggle switch, etc.)
3. Operate the switch, valve, or other energy isolating device (s) so that the equipment is isolated from its energy sources (s). Stored energy (such as that in springs, elevated machine members, retaining flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as repositioning, blocking, bleeding down, etc. (Type (s) of stored energy-methods to dissipate or restrain).
4. Lockout and tagout the energy isolating devices with assigned individual lock(s) or tag (s) (Method (s) selected; i.e., locks, tags, additional safety measures, etc.).

5. After ensuring that no personnel are exposed, and the energy source is isolated, operate the push button or other normal operating controls to make certain the equipment will not operate (Type (s) of Equipment checked to ensure disconnections).

CAUTION: Return operating controls to “neutral” or “off” position after the test.

6. The equipment is now locked out and tagged out.

VIII. **Restoring Machines or Equipment to Normal Production Operation**

1. After the servicing and/or maintenance are complete and equipment is ready for normal production operations, check the area around the machine or equipment to ensure that no one is exposed.
2. After all tools have been removed from the machine or equipment, guards have been reinstalled and employees are in the clear, remove all lockout or tagout devices. Operate the energy isolating devices to restore energy to the machine or equipment.

IX. **Procedure Involving More than One Person**

In the preceding steps, if more than one individual is required to lockout and tagout equipment, each shall place his/her own personal lockout/tagout device on the energy isolating devices (s). When an energy isolating device cannot accept multiple locks or tags, a multiple lockout/tagout device (hasp) may be used. For multiple personnel, a lockbox or cabinet may be used which allows the use of multiple locks to secure it. Each employee will use his/her own lock to secure the box or cabinet. As each person no longer needs to maintain his or her lockout protection, that person will remove his/her lock from the box or cabinet.

X. **Basic Rules for Using Lockout or Tagout System Procedure**

All equipment shall be locked out and 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 and tagged out.

XI. **Safety Lock Removal**

Prior to the removal of a lock, three attempts of contact must be made to employee prior to cutting the lock. Two supervisors must be notified and conclude the removal of the lock. If the employee is located and

XI **Non-University Contractors**

All non-University employees working for contractors on University property or in contract for the University must abide with the University’s Lockout/Tagout Policy and

all lockout/tagout regulations. Written verification as to the contractor's policy and implementation of a Lockout/Tagout Program will be supplied to the University upon request.

XII.

Training

The University will provide 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 safe application, usage, and removal of the energy controls are acquired by employees

Training for all University employees that may have the opportunity to service or repair equipment with hazardous energy will be trained with the following information:

- Each authorized employee will 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 will 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, will be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out and tagged out.
- When tagout systems are used, employees will also be trained in the following limitations of tags:
 - 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.

Employee retraining.

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. Additional retraining will also be whenever there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures. The retraining will reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary. The University will 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.

APPENDIX A
OSHA FACT SHEET 89-32

U.S. Department of Labor

Program Highlights

Fact Sheet No. OSHA 89-32

CONTROL OF HAZARDOUS ENERGY SOURCES (LOCK-OUT/TAGOUT)

SCOPE

The standard for the control of hazardous energy sources (lockout-tag out) covers servicing and maintenance of machines and equipment in which the unexpected energization or start up of the machines or equipment or release of stored energy could cause injury to employees.

The rule generally requires that energy sources for equipment be turned off or disconnected and that the switch either be locked or labeled with a warning tag.

About three million workers actually servicing equipment face the greatest risk. These include craft workers, machine operators, and laborers. OSHA data show that packaging and wrapping equipment, printing presses, and conveyors account for a high proportion of the accidents associated with lockout/tagout failures. Typical injuries include fractures, lacerations, contusions, amputations, and puncture wounds with the average lost time for injuries running 24 days.

Agriculture, maritime, and construction employers would be covered under future rulemakings. The generation, transmission, and distribution of electric power by utilities and work on electric conductors and equipment are excluded because lockout/tagout procedures for these specific industries are being included in separate standards under development for them.

GENERAL REQUIREMENTS

Under the ruling employers must:

- Develop an energy control program
- Use locks when equipment can be locked out.
- Ensure that new equipment or overhauled equipment can accommodate locks.
- Employ additional means to ensure safety when tags rather than locks are used by using an effective tagout program.
- Identify and implement specific procedures (generally in writing) for the control of hazardous energy including preparation for shutdown, shutdown, equipment isolation, lockout/tagout application, release of stored energy, and verification of isolation.
- Institute procedures for release of lockout/tagout including machine inspection, notification and safe positioning of employees, and removal of the lockout/tagout device.
- Obtain standardized locks and tags which indicate the identity of the employee using them and which are of sufficient quality and durability to ensure their effectiveness.

- Require that each lockout/tagout device be removed by the employee who applied the device.
- Conduct inspections of energy control procedures at least annually.
- Train employees in the specific energy control procedures with training reminders as part of the annual inspections of the control procedures.
- Adopt procedures to ensure safety when equipment must be tested during servicing, when outside contractors are working at the site, when a multiple lockout is needed for a crew servicing equipment, and when shifts or personnel change.

EXCLUSIONS

Excluded from coverage are:

- Normal production operations including repetitive, routine minor adjustments, and maintenance which would be covered under OSHA's machine guarding standards.
- Work on cord and plug connected electric equipment when it is unplugged, and the employee working on the equipment has complete control over the plug.
- Hot tap operations involving gas, steam, water, or petroleum products when the employer shows that continuity of service is essential, shutdown is impractical, and documented procedures are followed to provide proven effective protection for employees.

COMPLIANCE COSTS

Estimated costs for the 1.7 million affected establishments—mostly in manufacturing and service industries many of which are already in compliance—was expected to be \$214 million the first year and approximately \$135 million in subsequent years. Small establishments can expect implementation costs to be approximately \$125 while cost estimates for very large firms are approximately \$28,000.

BENEFITS

OSHA compliance with the standard will prevent about 120 fatalities and approximately 28,000 serious and 32,000 minor injuries each year. About 39 million general industry workers will be protected from accidents during maintenance and servicing of equipment under this ruling.

EFFECTIVE DATE

The final rule was published in the Federal Register Sept 1, 1989 with implementation effective Oct. 31, 1989.

LOCKOUT (OR TAGOUT) PROCEDURE

| <u>Entry No.</u> | <u>Description</u> |
|------------------|--|
| 1. | <u>Name of Company</u> |
| 2. | <u>Types and Magnitudes</u> of energy and hazards |
| 3. | <u>Names/Job Titles</u> of employees authorized to lockout or tagout |
| 4. | <u>Names/Job Titles</u> of affected employees and how to notify |
| 5. | <u>Types and Location</u> of energy isolating means |
| 6. | <u>Types of Stored Energy</u> -methods to dissipate or restrain |
| 7. | <u>Methods Selected</u> i.e., locks, tags, additional safety measures, etc. |
| 8. | <u>Types of Equipment</u> checked to ensure disconnections |
| 9. | <u>Names/Job Titles</u> of employees authorized for group lockout or Tagout |

LOCKOUT OR TAGOUT PROCEDURE

Lockout is the preferred method of isolating machines or equipment from energy sources.

This procedure establishes the minimum requirements for the lockout or tagout of energy isolating devices. It shall be used to ensure that the machine or equipment are isolated from all potentially hazardous energy, and locked out or tagged out before employees perform any servicing or maintenance activities where the unexpected energization, start-up or release of stored energy could cause injury.

This procedure explains the safety significance of the lockout (or tagout) procedure. Each new or transferred affected employee and other employees whose work operations are, are may be, in the area shall also be instructed in the purpose and use of the lockout or tagout procedure.

Preparation for Lockout or Tagout

Make a survey to locate and identify all isolating devices to be certain which switch (s), valve (s) or other energy isolating devices apply to the equipment to be locked or tagged out. More than one energy source (electrical, mechanical, or others) may be involved.

Sequence of Lockout or Tagout System Procedure

1. Notify all affected employees that a lockout or tagout system is going to be utilized and the reason for the lockout or tagout. The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the hazards thereof.
2. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open toggle switch, etc.)
3. Operate the switch, valve, or other energy isolating device so that the equipment is isolated from its energy source(s). Stored energy (such as that in springs, elevated machine members, retaining flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as repositioning, blocking, bleeding down, etc.
4. Lockout and/or tagout the energy isolating devices with assigned individual lock(s) or tag(s).
5. After ensuring that no personnel are exposed, and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment will not operate.

CAUTION: Return operating control(s) to “neutral” or “off” position after the test.

6. The equipment is now locked out or tagged out.

Restoring Machines or Equipment to Normal Production Operation

1. After the servicing and/or maintenance is complete and equipment is ready for normal production operations, check the area around the machine or equipment to ensure that no one is exposed.
2. After all tools have been removed from the machine or equipment, guards have been reinstalled and **everyone is in the clear**, remove all lockout or tagout devices. Operate the energy isolating devices to restore energy to the machine or equipment.

Procedure Involving More Than One Person

In the preceding steps, if more than one individual is required to lockout or tagout equipment, each shall place his/her own personal lockout device or tagout device on the energy isolating device(s). When an energy isolating device cannot accept multiple locks or tags, a multiple lockout or tagout device (hasp) may be used. If lockout is used, a single lock may be used to lockout the machine or equipment with the key being placed in a lockout box or cabinet. As each person no longer needs to maintain his or her lockout protection, that person will remove his/her lock from the box or cabinet.

Basic Rules for Using Lockout or Tagout System Procedure

All equipment shall be locked 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 or tagged out.

Lockout/Tagout Supplement

Lockout is the preferred method of isolating machines or equipment from energy sources.
(See Lockout/Tagout Procedure for Correlating Sections)

Employee effected by this Procedure:

Name: _____

Job Title: _____

Preparation for Lockout or Tagout: Type(s) and Location(s) of energy isolating means:

Sequence of Lockout or Tagout System Procedure

Normal stopping procedure: List Method: _____

Type(s) of Stored Energy-methods to dissipate or restrain (if required – see **Item 3 in sequence**):

Method selected: i.e., locks, tags, additional safety measures, etc. (see **Item 4 in sequence**):

Type(s) of equipment checked to ensure disconnections (see **Item 5 in sequence**):

I have read and fully understand my responsibilities in connection with the Lockout/Tagout Procedure attached to this supplement.

Name _____ Date _____

APPENDIX B-
OSHA 29 CFR 1910.147

**APPENDIX C-
SAFETY LOCK REMOVAL FORM**

**University of Dayton
SAFETY LOCK REMOVAL INCIDENT**

LOCK I.D. # : _____

DATE REMOVED: _____ TURN REMOVED: 1st 2nd 3rd

LOCATION THAT SAFETY LOCK WAS REMOVED FROM: _____

REASON FOR SAFETY LOCK REMOVAL: _____

LOCKED OUT BY: NAME _____

REMOVED BY: NAME: _____
(need 2 supervisors) NAME: _____

WITNESS/HELPER: NAME _____

DESCRIBE WHAT ACTION WAS TAKEN TO CONTACT THE DEPARTMENT SHOP,
SERVICE, OR INDIVIDUAL OWNER OF THE SAFETY LOCK: _____

EMPLOYEE NOTIFICATION OF SAFETY LOCK REMOVAL

EMP SIGNATURE: _____ DATE _____ TURN _____

SUPERVISOR _____