

Control of Hazardous Energy Program – Lockout/Tagout

1.1 Purpose, SCOPE, and Policy

1.1.1 Purpose

The purpose of this lockout/tagout program is to control the unexpected startup of machines or equipment, and the release of stored energy that could harm employees.

1.1.2 Scope

This program applies to the control of energy during servicing and maintenance of machines and equipment. This program establishes the requirements for isolation of potential energy sources such as: electrical, mechanical, chemical, thermal, hydraulic, pneumatic, and gravitational, prior to equipment repair, adjustment, or removal.

1.1.3 Policy

Specific Goals:

- Establish a safe and positive means of shutting down machinery, equipment, and systems.
- Prevent unauthorized personnel or remote-control systems from starting machinery or equipment while it is being serviced.
- Provide a secondary control system (tagout) to warn and notify workers when equipment is in lockout status;
- Establish responsibility for implementing and controlling lockout/tagout procedures.
- Ensure that only approved locks, standardized tags and fastening devices provided by the company will be utilized in the lockout/tagout procedures

1.2 Roles & Responsibilities

1.2.1 Employer Responsibilities

It is management's responsibility to do the following:

- Establish a program consisting of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, startup or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative.
- Create written machine specific lockout/tagout procedures, monitor implementation, maintain records, and ensure compliance
- Provide the required equipment needed for lockout/tagout procedures
- Ensure that employees required to service and maintain equipment and machines are properly trained as Authorized Employees prior to performing maintenance to equipment and machines
- Provide training for ALL impacted workers

1.2.2 Employee Responsibilities

It is employee's responsibility to follow the written procedures for lockout/tagout. Only Authorized Employees will perform maintenance on equipment and machines by following the proper lockout/tagout procedures. All affected and other employees will not tamper with or remove any lockout/tagout devices put in place by an Authorized Employee.

- Authorized employees are responsible for following established lockout/tagout procedures.
- Affected employees are responsible for recognizing and understanding the LOTO program requirements.

1.3 Definitions

See Definitions Chapter at the end of the Safety and Health Manual. ⁱ

1.4 Hazards

Improper use or failure to use lockout/tagout procedures may result in electrocution, electrical shock, amputation, laceration, chemical exposure, skin burns, fires, explosions, chemical releases, eye injury, or death.

1.5 Hazard Control Measures

Only authorized and trained employees may engage in tasks that require use of lockout/tagout procedures.

Procedures shall be developed, documented, and utilized for the identification and control of potentially hazardous energy when employees are engaged in machine and equipment servicing and maintenance.

NOTE: *Exception:* The employer need not document the required procedure 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 re-accumulation of stored energy after shut-down which could endanger employees; and
- the machine or equipment has a single energy source which can be readily identified and isolated; and
- the isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment; and
- the machine or equipment is isolated from that energy source and locked out during servicing or maintenance; and
- a single lockout device will achieve a locked-out condition; and
- the lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance; and
- the servicing or maintenance does not create hazards for other employees; and
- the employer, in utilizing this exception, has had no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

Restoration from lockout/tagout is a controlled operation and may ONLY be performed by Authorized worker trained to perform this task.

1.5.1 Lockout/Tagout Energy Assessment

Management will complete an energy assessment to identify all energy source hazards. These assessments will be utilized in the creation of new Lockout/Tagout procedures and will be reviewed as part of the annual inspection of Lockout/Tagout machine specific procedures.

The Equipment Inventory and Lockout/Tagout Procedure Assessment Log included within this program will be used to identify which machines and equipment need lockout/tagout procedures and to track annual inspections of the procedures.

1.5.2 Lockout/Tagout Procedures

Management will prepare a machine-specific Lockout/Tagout procedure for all machines requiring one. Each procedure shall identify specific steps for Authorized Employees to follow. An example lockout/tagout procedure is included at the end of this program for review.

Prior to working on, repairing, adjusting, maintaining, or replacing machinery and equipment, the following seven-step process will be utilized to develop procedures to place the machinery and equipment in a neutral or zero energy state.

Before Authorized Employees shut down a machine or piece of equipment, the Authorized Employee will have knowledge of the type and magnitude of the energies involved, the hazards of the energies to be controlled, and the means to control the energy

1.5.2.1 Communicate

- Notify all Affected Employees that the machinery, equipment, or process will be out of service. Affected employees are those impacted by a machine or piece of equipment being placed in lockout condition. These may be operators of the equipment being serviced or employees working up or downstream of the equipment and their work process may be disrupted as a result of the equipment being shut down.

1.5.2.2 Machine or Equipment Shutdown

- The machine or equipment will be shut down using normal shutdown procedures for that unique machine. An orderly shutdown will be utilized to avoid any additional or increased hazards to employees as a result of equipment de-energization.
- If the machinery, equipment, or process is in operation, follow normal stopping procedures (depress stop button, open toggle switch, etc.)
- Normal shutdown procedures must be spelled out in the lockout/tagout procedure for reference.

1.5.2.3 Isolate Energy Sources

- All energy control devices used to isolate the energy to the machine or equipment will be physically located and installed in such a manner as to isolate the machine or equipment from the energy source.
- Move switch or panel arms to 'OFF' or 'OPEN' positions and close all valves or other energy isolating devices so that the energy source(s) is disconnected or isolated from the machinery or equipment.

1.5.2.4 Lockout/Tagout Device Application

- Lockout or tagout devices will be affixed to energy isolating devices by Authorized Employees.
- Lockout devices will be affixed in a manner that will hold the energy isolating devices in the 'SAFE' or 'OFF' position and prevent energization of the equipment.
- Where tagout devices are used they will be affixed in such a manner that clearly states that the operation or the movement of energy isolating devices from the 'SAFE' or 'OFF' positions is prohibited.
- Each Authorized Employee must place their own lock and tag on each energy control point.
- Using or removing the lock or tag of another Authorized Employee is prohibited without supervisor authorization.

1.5.2.5 Release Stored Energy

- Following the application of the lockout or tagout devices to the energy isolating devices, all potential or residual energy will be relieved, disconnected, restrained, and otherwise neutralized.
- Stored energy (capacitors, springs, elevated members, rotating fly wheels, and hydraulic/air/gas/steam systems) must be relieved or restrained by grounding, repositioning, blocking, and/or bleeding the system.

1.5.2.6 Verify De-energization

- Prior to beginning work on machines or equipment that have been locked and/or tagged out, the Authorized Employee(s) will verify that isolation or de-energization of the machine or equipment has been accomplished.
- After ensuring that no employee will be placed in danger, test all lock and tag outs by following the normal start up procedures (depress start button, follow normal startup procedures, etc.).

NOTE: If after following the procedures the machine shows signs of not having been completely de-energized, **STOP** and notify the Supervisor. A critical step may have been missed, or the procedure may require review and modification.

1.5.2.7 Return all Controls to the Neutral Position

- During the verification process controls may have been manipulated to check for de-energization. Some controls may not automatically return to a neutral or safe position. This includes valves, hydraulic controls, ON/OFF switches, etc. It is critical that these controls are returned to the neutral or 'safe' position to prevent the machine from unexpectedly operating upon reactivation of the energy sources.

1.5.3 Lockout/Tagout for Electrical Plug-Type Equipment

An exemption is given to normal lockout/tagout procedures provided the equipment can be de-energized completely by unplugging the cord and that the cord remains in the exclusive control of the person performing the maintenance work. If these conditions are met, there is no need for further measures to be taken. In the event that the energy source is not under the exclusive control of the person performing the maintenance, regular lockout/tagout measures must be followed. Devices such as plug buckets, locks and tags may be used to lockout cord plugs.

1.5.4 Extended Lockout/Tagout

Should the shift change before the machinery or equipment can be restored to service, the lockout/tagout condition must be maintained. If the task is transferred to the next shift a coordinated process of transferring lockout control must be followed.

There are four effective methods to accomplish this requirement:

1. Authorized Employees leave their personal lockout devices in place until the job has been completed; OR
2. Following the lockout procedure, on-coming employees apply their lockout devices before off-going employees remove theirs. This method requires coordination between the two crews.; OR
3. Off-going employees remove their lockout devices from the energy isolation devices and restore the equipment to normal operating condition. Then the on-coming crew follows the lockout procedure from the beginning returning the equipment to lockout condition under their control.; OR
4. Transfer locks are used to maintain continuity of lockout. In this method of lockout, a 'Primary' Authorized Employee following the procedure attaches a transfer lock to each energy control device. The transfer lock should be clearly identifiable as a transfer lock.
 - Each Authorized Employee attaches their personal lock and tag to each energy control device until their task is completed or they go home for the day.
 - Each on-coming Authorized Employee attaches their lock and tag to each energy control device before working on the equipment.
- This process continues until the work has been completed and the last lockout locks and tags have been removed.
- The transfer locks are the last to be removed after the 'Primary' Authorized Employee confirms the equipment is ready for return to service and that no employees are in the area.

1.5.5 Lockout/Tagout – Multiple Employees

In the preceding procedures, if more than one employee is assigned to a task requiring a lock and tagout, each must also place his or her own lock and tag on the energy isolating device(s). This may be achieved through the use of a hasp or other similar device.

1.5.5.1 Group Lockout

There are occasions when multiple personnel will be working on the same piece of machinery or equipment. Workers may come and go independently, or there may be so many involved that it becomes infeasible to attach a large number of locks to a single energy isolation point. In these cases, a group lockout box is an effective means of maintaining lockout of the equipment.

When performing group lockout, a 'Primary' Authorized Employee locks out the equipment using their personal locks and tags. The keys for each of the locks are collected and placed in the group lock box and the 'Primary' Authorized Employee applies their lock to the group lockbox. Each Authorized Employee adds their lock to the group lockbox ensuring that the keys are inaccessible until their lock is removed. At the completion of the work the 'Primary' Authorized Employee checks the equipment and the area to ensure it is safe to return the equipment to normal operation. Once confirmed safe, the 'Primary' Authorized Employee removes their lock from the lockbox, accesses the secured keys, removes the locks from the energy isolating devices and restores the equipment to normal operation.



1.5.6 Testing or Positioning of Machines

During the course of maintenance and servicing work, machines and equipment may need to be tested or repositioned which might require the removal of locks and tags and temporary re-energization. When this is required, the following procedures shall be followed:

- Clear the machines or equipment of tools and materials
- Notify employees that will be affected by the re-energization
- Remove employees from the machines or equipment area to a safe location
- Remove the lockout/tagout devices

- Energize and proceed with testing or positioning
- Re-implement lockout/tagout procedures once testing, or repositioning is complete

1.5.7 Release from Lockout/Tagout

Prior to removing the locks and tags and restoring the equipment to normal operation, the following seven-step process will be followed to ensure employee safety.

1.5.7.1 Communicate

Before lockout and tagout devices are removed and the equipment is restored to normal operation, notify all Affected Employees of the equipment status change.

1.5.7.2 Verify the Safety of the Area

Check the work and surrounding areas to ensure all non-essential personnel are a safe distance from the equipment.

Check equipment surfaces to ensure no loose tools or parts can fall into the equipment and remove all loose tools, parts, and non-essential equipment from the area. Objects falling into the equipment can become projectiles or can cause significant damage to machinery.

1.5.7.3 Reinstall Machine Guarding and Safety Devices

- Before restarting the equipment, all machine guarding must be replaced and properly secured in position.
- All safety devices including latches, interlocks, barriers, positioning sensors, etc. must be reset and restored prior to re-energization.

1.5.7.4 Ensure all Controls are in the Neutral Position

Check all switches and controls to ensure they are in a safe position. This applies especially to ON/OFF switches, hydraulic controls, valves, and other devices that do not automatically return to a safe position when released.

1.5.7.5 Remove Lockout Locks, Tags, and Devices

Each Authorized Employee will remove their lock and tag from each lockout device applied to the equipment energy isolation points.

When all locks and tags have been removed, remove the lockout device, and prepare to re-energize the equipment.

1.5.7.6 Re-energize the Equipment

All personnel must be kept clear of equipment during initial startup.

Some machine functions may require re-energization in a specific order. The proper re-energization steps should be established in the machine-specific lockout procedure. Follow the procedure to ensure proper order of re-energization.

Following safe methods, re-energize the equipment. When re-energizing electrical equipment, it is best to stand clear of the front of the equipment and turn away when operating the switches. For example, standard disconnect switches usually have the switch lever or rocker on the right side of the box as you face it. A good practice is to stand off to the right of the switch and use the left hand turning away from the switch when operating the lever or rocker. Following this method can reduce the risk of exposure to electrical energy or arc-flash.

Wear proper personal protective equipment when re-energizing the equipment. Safety glasses are minimum required PPE.

1.5.7.7 Equipment Restart

Restart the equipment following normal startup procedures. Startup procedures should always follow manufacturer's instructions and should be identified in the lockout procedure for quick reference.

1.5.8 Management's Removal of Locks or Tags

Only the Authorized Employee that locks and tags out machinery, equipment, or processes may remove their lock and tag. However, should the employee leave the facility before removing their lock and tag and it is necessary to terminate the lockout procedure, the lockout/tagout device(s) may only be removed under the direction of management after the following criteria are met:

- Management will make every effort to contact the employee who installed the lockout devices. Attempts shall be documented including times, dates, contact methods, and phone numbers.
- If attempts to contact the employee are unsuccessful, another Authorized Employee and supervisor shall inspect the equipment to ensure it is safe to remove the lockout devices.
- Only a management representative will be allowed to authorize removal of the lockout devices.
- Upon return to work, the employee who originally implemented the lockout/tagout will be notified of the removal.

1.5.9 Outside Contractors

Outside contractors shall implement the lockout/tagout procedures enforced by their employer. A copy of their procedures will be obtained and reviewed by management prior to the start of work. Employees will be notified when an outside contractor's procedures are being utilized and they shall be informed of any special precautions necessary.

1.5.10 Lockout/Tagout Devices

All lockout/tagout devices will comply with the following requirements:

- Durability – Locks and tags must be able to withstand the environment in which they will be used. Tags must remain legible when used in corrosive or wet environments.
- Standardized – Both lockout and tagout devices must be standardized according to color, shape, or size. Tags must be standardized according to print and format.
- Substantial – Lockout and tagout devices must be substantial enough to minimize early or accidental removal. A tag means of attachment must be non-reusable unless attached to a lock.
- Identifiable – Locks and tags must clearly identify the employee who applied them.
- Tags shall warn of the hazardous conditions should the equipment be energized and shall include a legend such as one or more of the following: DO NOT START, DO NOT OPEN, DO NOT CLOSE, DO NOT ENERGIZE, DO NOT OPERATE.

1.5.11 Inspections

An initial and then periodic inspections, at least annually, will be performed and documented by a qualified person. The purpose is to determine whether or not the authorized employee is utilizing the procedures properly, and that the procedures are valid. This requirement will be performed for each authorized person, and on each machine or piece of equipment for which they are responsible.

Inspections of procedures will be logged using the Equipment Inventory and Lockout/Tagout Procedure Assessment Log found within this program.

NOTE: For identical machines or machine types using identical lockout/tagout procedures, the Authorized Employee may be inspected on one of those machines and procedures. For example; if the authorized person is responsible for six identical or substantially similar saws, and the procedure for all of the saws is the same, the employee would only be inspected on one of those machines, not all six.

1.5.11.1 Initial Inspection

Upon first assignment the Authorized Employee shall be evaluated by the employer to ensure understanding of the program and the procedures. The employee will be inspected on each machine or group of substantially similar machines (see note in section 5.11) for which they are responsible to confirm the employee properly follows the procedure locking out the equipment.

If it is determined that the procedures are not being utilized properly then additional training or corrections must be made to bring the employee and the procedures into compliance.

The Initial Inspection shall be performed utilizing the Authorized Employee Initial Inspection Certification form included within this program. It shall include the following information:

- The name of the authorized employee(s) observed.
- The date of the inspection.
- The name of the inspector.
- The identity of the machine or equipment locked out
- Check-off confirmation that each step was properly followed
- Any deficiencies noted, or alterations to the procedure needed.

1.5.11.2 Periodic Inspection

The Authorized Employee shall be inspected periodically in periods not to exceed twelve (12) months.

The Authorized Employee shall be evaluated by the employer to ensure understanding of the program and the procedures. The employee will be inspected on each machine or group of substantially similar machines (see note in section 5.11) for which they are responsible to confirm the employee properly follows the procedure locking out the equipment.

The documented inspection shall be performed utilizing the Authorized Employee Periodic Inspection Certification form included within this program. It shall include the following information:

- The name of the authorized employee(s) observed.
- The date of the inspection.
- The name of the inspector.
- The identity of the machine locked or tagged out.
- Any deficiencies noted, or alterations to the procedure needed.

1.6 Training

The employer shall 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 the safe application, usage, and removal of the energy controls are acquired by employees.

All authorized employees will be trained to use the lockout/tagout procedures. The training will be conducted prior to the employees' first use of the procedures. Employees will be trained on the purpose of the program, the potential energy sources available, the general procedures, and the location and use of the specific procedures. All affected and other employees that are not authorized to perform lockout/tagout procedures will be trained to awareness and understanding of the lockout/tagout program.

Provided training must ensure that the purpose and function of the energy control program is understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees.

1.6.1 Initial

1.6.1.1 Authorized Employee

Each Authorized Employee 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.

Authorized Employees will be trained to use the Lockout/Tagout Procedures. The training will be conducted prior to the employees' first use of the procedures. The training will consist of the following:

- Review of the program
- Discussion of the potential energy sources
- Review of Specific Procedures for machinery, equipment, and processes
- Location and use of Specific Procedures
- An initial inspection utilizing the Periodic Inspection form

1.6.1.2 Affected Employee

Each affected employee shall be instructed in the purpose and use of the energy control procedure.

This training will include:

- Repair and servicing of machinery and equipment shall be performed only by Authorized Employees.
- Lockout devices and tags shall be applied only by Authorized Employees.
- Affected employees may not remove locks, locking devices, or tags from machinery or equipment.
- Machinery and equipment that has been locked or tagged out of service shall not be tampered with.

1.6.1.3 Other Employees

All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the program and procedures, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

This training will include:

- Repair and servicing of machinery and equipment shall be performed only by Authorized Employees
- Other employees may not remove locks, locking devices, or tags from machinery or equipment.
- Machinery and equipment that has been locked or tagged out of service shall not be tampered with.

1.6.2 Refresher

Refresher training will be provided whenever there is a change in the employee's 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 refresher training will also be conducted whenever a periodic inspection reveals, or whenever management has reason to believe that the authorized employee's practice, knowledge, or understanding of the lockout/tagout program is deficient. The refresher training will reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

1.7 Reference

OSHA Standard 29 CFR 1910.147

¹Lockout/Tagout – Control of Hazardous Energy Program

Affected employee - An employee whose job requires them to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires them 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 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.

Other Employees - Identified as those who do not fall into the authorized or affected employee's categories. These employees will be provided instruction in the purpose of the program and their responsibilities related to lockout/tagout.

Qualified Person - OSHA defines a qualified person as one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems relating to the subject matter, the work, or the project.

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.

This program is a component of the FCA Safety Manual. Visit www.finishingcontractors.org/resources/ to request your company's complimentary Safety Manual if your company has not yet done so.