

# Control of Hazardous Energy: Lockout/Tagout Programs

## Risk Control from Liberty Mutual Insurance



The purpose of lockout/tagout (LOTO) is to prevent employee injuries caused by unexpected release of hazardous energy, whatever form that may be.

Typical situations where LOTO is needed include but are not limited to system repair, maintenance, cleaning, and setup changes. This reference note outlines development of a comprehensive LOTO Program. This guide should be used in combination with RC 6205, Control of Hazardous Energy: Lockout/Tagout Initial Survey Guide, which outlines steps for an initial survey to understand the risks of hazardous energy.

### Highlights:

- Application
- Program Overview
- Establishing a Written Program
- Lockout Protective Materials, Devices, Hardware, and Tags
- General and Equipment-Specific Procedures
- Training
- Auditing and Verifying Process Effectiveness

### Application

Lockout/tagout should be applied during equipment repairs, maintenance, cleaning, setup, and other non-production operations. Lockout/tagout should also be used for selected tasks during normal production operations, such as troubleshooting and unjamming equipment if the employee is required to:

- Remove or bypass machine guards or other safety devices,
- Place any part of his or her body in contact with hazardous machine parts, and/or
- Place any part of his or her body into a danger zone during machine movement.

### LOTO Program Overview

The major components of an effective program for control of hazardous energy include:

- Establishing a written program with assignment of duties and responsibilities,
- Completing a survey to identify and assess all sources of hazardous energy and to identify all energy-isolating devices (See RC 6205),
- Obtaining appropriate energy-isolating devices and hardware to disable energy sources,
- Developing written general and equipment-specific procedures,
- Training of personnel, and
- Periodic auditing and adjusting of the program elements.

### Establishing a Written Program

Top management needs to develop and support implementation of a written LOTO program. When developing your program, review the minimum OSHA lockout regulations and the provisions in ANSI Z244.1 on the control of hazardous energy. Some important program components include:

- Scope and purpose of the program.
- Roles and responsibilities for all individuals covered by the program including the LOTO Program Manager.
- Specific steps needed to shut down, isolate, block, and secure machines, equipment, and processes from all sources of potential residual energy and movement.
- The procedure for placing, removing, and transferring lockout devices (and who has responsibility for them), and returning machines and processes to pre-LOTO condition.

- Specific requirements for testing machines or equipment to verify “zero energy state” and the effectiveness of locks and other energy control measures.

### Lockout Protective Materials, Devices, Hardware, and Tags

Obtain appropriate lockout equipment to secure energy-isolation devices to prevent them from being energized. An energy-isolating device is a durable and standardized physical device that prevents transmission or release of energy. Examples include:

- Manually operated electrical circuit breakers.
- Disconnect switches.
- Pressurized fluid power (pneumatic, hydraulic, or steam) valves that block or contain and redistribute all energy posing a threat.

Locking devices should be uniquely identified, dedicated for use exclusively for this purpose, standardized, and capable of withstanding the environment to which they are exposed.

- Issue key-operated padlocks to each person involved. No two locks should have the same pattern. Identify each lock with the owner’s name and department. Avoid use of combination locks.
- Every employee who is working on a machine should place a lock on the locking location of the energy-isolating device. Lockout hasps or adapters that hold several locks should be available to each person who has been issued a lock. Cables or chains may also be needed to secure large valves in the closed position.
- Do not rely on pulling fuses as a substitute for placing a lock on the energy-isolating device. A pulled fuse does not guarantee that the circuit is dead, nor does it prevent someone from replacing the fuse.
- Do not rely on locking out operating controls instead of the power sources.
- Do not assume the job is too small to require lockout.
- Tags are to be used along with locks as a supplemental informative aid. Danger tags that include an explanation of what equipment is locked out, by whom, and for what purpose can be very helpful.
- It is strongly advised that you do not use tags without locks; doing so presents a higher risk that could result in serious injury or fatality.



### General and Equipment-Specific Procedures

Systems and methods for consistently following a strict LOTO protocol involve both general and equipment-specific work practices. General procedures provide overall guidance on the necessary steps to follow, such as:

- Preparing for shutdown.
- Completing shutdown with de-energizing of all sources.
- Engaging energy-isolating devices.
- Applying locking devices.
- Releasing, dissipating, or blocking all sources of stored energy, verifying the release, and preventing re-accumulation of energy.
- Testing to ensure zero energy and safe work conditions prior to beginning any work. Test equipment, such as volt meters, may be needed to verify zero energy.
- Verify that “start” features are fully disabled and that no one is in a dangerous position. Try the starting controls to ensure the equipment will not operate. Make sure you return the operating controls to the neutral or “off” position after this test.

- Removing locks or devices and verifying clearance.
- The only employee who should remove the lock is the one who installed it. Authorized personnel should visually inspect the area before power is restored to ensure that everyone is clear of the equipment, safeguards have been restored, and the work has been properly completed.
- Re-energizing and start-up sequences.

Equipment-specific procedures should be developed and documented to provide detailed guidance on how the general procedures will apply to all of the individual energy sources. This should include methods for each step of the general procedures as well as indication of any special requirements and personal protective equipment.

## Training

Provide all employees with initial and ongoing training so they understand the program's objectives and procedures, as well as their own responsibilities. Be sure to include new and transferred employees. Employees authorized to apply lockout and perform work on equipment will require more extensive training, including recognition of hazardous energy sources, the type and magnitude of energy, and the methods and means necessary for energy isolation and control. Retrain workers when there is a change in machines, equipment, processes, or the energy control procedures. Document all training including participants, date, content, and trainer.

## Auditing and Verifying Process Effectiveness

Be sure you understand and consistently enforce your written lockout procedures. Audit your program frequently to ensure that all procedures and safety rules are followed.

At least annually:

- Perform a review of all authorized employees to ensure that they can properly perform the required procedures. This review should be completed by an authorized person other than the one being reviewed.
- Conduct a review of equipment-specific energy control procedures. Grouping procedures for similar machines or equipment may streamline the inspection and review process.

The benefits of establishing an effective lockout program can include fewer worker injuries and fatalities, reduced equipment damage, and improved efficiency. Remember this safety absolute: "The person exposed to the hazard needs to be in control of the hazard." Locking out energy-isolation devices is the best way to accomplish this.

## References and Resources

ANSI Z244.1, Control of Hazardous Energy.

OSHA 1910.147, Control of Hazardous Energy (Standard)

OSHA 3120, Control of Hazardous Energy (Information Booklet)

RC 5057, Lockout/Tagout: A Guide for Supervisors

RC5295, Model Safety Plan: Lockout/Tagout and Zero Energy State

RC 5384, Machine Injury Risk Assessment: R3 Residual Risk Reduction for Lockout/Tagout

RC 6205, Control of Hazardous Energy: Lockout/Tagout Initial Survey Guide

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