



Lock Out/Tag Out: Control of Hazardous Energy (LOTO)

Environmental Health & Safety / Risk Management

229-4503



LOTO

- ◆ "Lockout/Tagout (LOTO)" refers to specific practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities.



LOTO

- ◆ Approximately 3 million workers service equipment and face the greatest risk of injury if lockout/tagout is not properly implemented.
- ◆ Compliance with the lockout/tagout standard prevents an estimated 120 fatalities and 50,000 injuries each year.



LOTO

- ◆ Workers injured on the job from exposure to hazardous energy lose an average of 24 workdays for recuperation.
- ◆ In a study conducted by the United Auto Workers (UAW), 20% of the fatalities (83 of 414) that occurred among their members between 1973 and 1995 were attributed to inadequate hazardous energy control procedures specifically, lockout/tagout procedures.



OSHA 1910.147

◆ Lockout:

- The placement of a lockout device on an energy-isolating device ensuring the equipment being controlled cannot be operated until the lockout device is removed.



OSHA 1910.147

◆ Tagout:

- The placement of a tagout device on an energy-isolating device, to indicate that the equipment being controlled may not be operated until the tagout device is removed.





Definitions

- ◆ Energy Isolating Device- mechanical device that physically prevents the transmission or release of energy: manually-operated electrical circuit breakers, disconnect switches, line valves, blocks, etc
- ◆ Capable of being locked out: designed with hasp or integral part to which a lock can be attached, self locking mechanism, or can be locked w/o dismantling, rebuilding or permanently altering its energy control capacity.



Definitions

- ◆ Affected employee: performs the duties of the job in an area in which the energy control procedure is implemented and servicing or maintenance operations.
- ◆ Does not perform servicing or maintenance on machines or equipment and is not responsible for implementing the procedure.



Definitions

- ◆ Authorized employee: performs servicing or maintenance on machines and equipment. LOTO is used for their own protection.



What activities are covered?

- ◆ Any servicing and/or maintenance of machines or equipment when the source of energy to the machines or equipment is electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.



What activities are covered?

- ◆ Constructing, installing, setting up, adjusting, inspecting, modifying, maintaining and/or servicing machines or equipment, including lubrication, cleaning or unjamming of machines or equipment, and making adjustments or tool changes, where employees could be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.



Activities NOT covered

- ◆ Servicing and/or maintenance of equipment performed during normal production operations **if:**

The safeguarding provisions are effective in preventing worker exposure to hazards created by the unexpected energization or startup of machines or equipment, or the release of energy.



Activities NOT covered

- ◆ Minor tool changes and adjustments, and other minor servicing activities that take place during normal production operations which are routine, repetitive, and integral to the use of that production equipment, as long as workers are effectively protected by alternative measures which provide effective machine safeguarding protection.



Activities NOT covered

- ◆ Work on cord and plug connected electrical equipment, **if:**

The equipment is unplugged from the energy source and the authorized employee has exclusive control of the plug.



Energy Control Program- 3 parts

- ◆ Energy control procedures- how authorized employees accomplish lockout/tagout
- ◆ Employee training- ensures that the purpose and function of the energy control programs are understood
- ◆ Periodic inspections- ensure that the procedures and the requirements of the standard are being followed



Energy Control Program

- ◆ Intended to prevent the unexpected energizing or the release of stored energy in machines or equipment on which servicing and maintenance is being performed by employees
- ◆ Consists of **DOCUMENTED** energy control procedures, an employee training program, and periodic inspections of the procedures



Types of Energy

- ◆ Stored energy
- ◆ Pneumatic energy
- ◆ Hydraulic energy
- ◆ Electrical energy
- ◆ Water
- ◆ Gas
- ◆ Etc...



Energy Control Procedure

- ◆ Written procedures- authorized employees must know in order to control hazardous energy
- ◆ At minimum:
 - How the procedure will be used
 - Steps to shut down, isolate, block, and secure machines or equipment
 - Steps for safe placement, removal, and transfer of LOTO devices and who is responsible
 - Rqmts for machines to verify the effectiveness of locks, tags and other methods



Energy Control Program

- ◆ Procedures must include:
 - Preparing for shutdown
 - Shutting down the machine or equipment
 - Isolating from the energy source
 - Applying LOTO devices
 - Safely releasing all potentially hazardous stored or residual energy
 - Verifying the isolation prior to service or work



Energy Control Program

- ◆ Before LOTO devices are removed and energy is restored, steps must be taken to re-energize equipment after service is complete:
 - Assure components are operationally intact
 - Notifying affected employees that LOTO devices are removed from each energy-isolating device by the employee who applied the device (authorized employee)



Energy Isolating Devices

- ◆ Guards against accidental start up or unexpected re-energization during service- i.e. manually operated electrical circuit breakers, disconnect switches, line valves, and blocks.

Two Types: those being capable of being locked out and those that are not



Energy Isolating Devices

- ◆ When the energy-isolating device cannot be locked out, the employee must use tagout or replace the device to make it capable of being locked.
- ◆ When using tagout, there are limitations of tags



Limitations for tags

◆ Tags:

- do not provide physical restraint
- it is not meant to be removed by unauthorized personnel
- must be legible
- must be able to withstand environmental conditions
- cannot be accidentally detached



Requirements for LOTO Devices

- ◆ Must be ONLY devices used for controlling hazardous energy:
 - **Durable**- LOTO devices must withstand the environment to which they are exposed.
 - Tagout devices must be constructed and printed so they do not deteriorate
 - **Standardized**- Both LOTO devices must be standardized according to color, shape, or size
 - Tagout must be standardized to print & format



Requirements for LOTO Devices

-Substantial- LOTO devices must be substantial enough to minimize early or accidental removal. Locks must be substantial to prevent removal. Tags means of attachment must be non-reusable, attachable by hand, self-locking and non-releasable, with a minimum unlocking strength of no less than 50 lbs.

Requirements for LOTO Devices

- ◆ The device for attaching the tag also must have the general design and basic characteristics equivalent to a one-piece nylon cable tie that will withstand all environments and conditions





Requirements for LOTO Devices

- ◆ Identifiable- Locks and tags must clearly identify the employee who applies them . Tags must warn against hazardous conditions if the machine or equipment is energized and must include a legend such as
 - Do Not Start
 - Do Not Open
 - Do Not Close
 - Do Not Energize
 - Do Not Operate

Examples of LOTO



Examples of LOTO





LOCKOUT / TAGOUT







Group LOTO Requirements

- ◆ When a group is performing service:
 - Level of protection equivalent to that provided by the implementation of a personal lockout or tagout device
 - Primary responsibility for a set number of employees working under the protection of a group lockout or tagout device must be vested in a single authorized employee.



Group LOTO Requirements

- The single authorized employee must determine the exposure status of individual group members.
- If there will be more than one crew, department, or group involved in the activity, a single authorized employee must be designated to coordinate affected workforces and to ensure continuity of protection.



Group LOTO Requirements

- ◆ Each authorized employee must affix a personal lockout or tagout device as required in the standard when work begins and remove it when work is completed



Training

- ◆ Initial training must be provided to those covered by the standard (authorized or affected employees)
- ◆ Retraining must be provided whenever there is a change in job assignments, a change in machines, equipment or processes that present a new hazard, or change in energy procedure



Training

- ◆ Additional training whenever a periodic inspection reveals, that there are deviations or inadequacies in the energy control procedure



Periodic Inspections

- ◆ Must be performed annually to assure that the energy control procedures continue to be implemented properly and that the employees are familiar with their responsibilities
- ◆ Performed by authorized employee



Quiz

- ◆ In order to complete this training, please take the associated online quiz.
- ◆ If you have any questions, please call us at x94503.

Thank you!