

# RiskTopics

## Lockout/Tagout

### Zurich Resilience Solutions - Risk Engineering

A lockout/tagout management program is an essential tool to aid in reducing the risk of injury from unintended energizing of machinery or equipment. It is also consistent with the current provisions of the OSHA lockout/tagout standard.

#### Introduction

Machinery and equipment that start-up unexpectedly while someone is performing maintenance or repairs can be a serious safety hazard. Many workplace fatalities occur because of improper lockout and/or tagout procedures being used while workers perform normal maintenance and repair duties. OSHA has established a standard, Control of Hazardous Energy (29 CFR 1910.147), to help control unexpected energy sources and assist companies in establishing a lockout/tagout program. Gravity is considered energy. Therefore, the standard applies to components that are powered by electricity, hydraulics, pneumatics, gasoline, and diesel. Components raised in position or spring operated are included in this standard and need blocking or should otherwise be secured in place. The OSHA rule includes information on applications, servicing and maintenance operations, provisions, requirements, inspections, removal, and other related issues of isolating energy sources by lockout/tagout.

#### Discussion

Lockout means adding a special lock or other device to the normal process of shutting down and securing the machinery to perform maintenance or repairs. The act of locking out the power source on the device prevents unexpected start-up and operation of the equipment during repair activities. When equipment cannot be properly locked out, it must be tagged out with a special tag warning other workers of the danger.

All machines that have had a major renovation and all new installations of machines require an energy-isolating device capable of being locked out. Tagout only applies to some older systems that do not have a lockable device. Any time a tagout device is used, it must provide the same level of protection as a lockout device.

Activities where the employee may be exposed to the unexpected energization or start-up of the equipment or release of hazardous energy include constructing, installing, setting up, adjusting, inspecting, modifying, maintaining, or servicing. Tasks may include lubrication, cleaning, unjamming, making adjustments, or tool changes.

## Guidance

### Definitions

**Authorized employee** - A person who locks out or tags out machines or equipment 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.

**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 where such servicing or maintenance is being performed.

Only authorized employees who have been trained should perform lockout procedures and remove locks and tags. However, all employees need to understand the lockout and tagout procedures.

Consider these ten tips to lock out the energy source hazards. Following these simple steps can help prevent accidents from occurring while maintaining machinery.

- **Think, plan, and check.** Think through the entire work procedure and identify all energy sources and all parts of any system that need to be shut down. Locate switches, valves, and other devices that need to be locked out. Some machines have multiple energy sources, such as electrical, hydraulic, or pneumatic, in combinations, and gravity needs to be considered in all circumstances.
- **Communicate.** Let other employees working on the equipment know when and why you are shutting down the system.
- **Locate all power sources.** This includes stored energy in spring and hydraulic systems. Sometimes, blocks are needed to secure an operation. An electrical source is not the only source of energy likely to cause injury if not properly locked or tagged out. Hydraulic, pneumatic, chemical, thermal, mechanical energy, and gravitational sources must be considered.
- **Neutralize all power at its source.** Disconnect electricity and block any movable parts. Release or block spring energy. Drain all hydraulic and pneumatic lines. Lower suspended parts to rest position. Neutralize stored energy in coils or transformers.
- **Isolate equipment.** Close all valves on any steam or process piping systems that connect to the equipment being serviced. In the event no valve is present, or the valve cannot be closed, a blank should be inserted in the pipe to ensure the stoppage of material flow into the equipment.
- **Lockout all sources.** Use a lock designed only for this purpose. Using a lockout tag that includes the name, date, time, and department that locks the machine out helps personalize and further document the lockout.
- **Test operating controls.** Test all controls to make certain the power is off and the lockout is effective.
- **Turn controls back off.** Be sure each control is in the off position before beginning any necessary maintenance.
- **Make necessary repairs** or provide the maintenance service planned.
- **Remove locks and restore energy.** Restart only after all other workers are at a safe distance away. Remove tools and replace machine guards. Notify other workers the machines are working and back in service.

Lockout is not required for cord and plug-connected electrical equipment if the plug is removed and is under the exclusive control of the person providing the service or maintenance. If the plug is not under the exclusive control of the person providing the service, then it should also be locked out.

### Machine or Equipment-Specific Procedures

Lockout tagout procedures must be specific to the machine or equipment being serviced. The standard requires the employer to develop and implement a procedure for each machine and piece of equipment that has multiple energy sources or has complex lockout requirements. In these instances, the written procedures include:

- A procedural use statement explaining how to use the procedure.

- Define and explain the procedural steps to shut down, isolate, block, and secure the machine.
- Describe the specific steps for the safe placement, removal, and transfer of LOTO devices.
- Define who is responsible for the LOTO devices and the identity of those employees.
- Detail the specific requirements that will be used to test machines and equipment to confirm the effectiveness of lockout devices.
- Identify all sources of hazardous energy.

#### **Minor tool changes and adjustments, and other minor servicing activities exclusion**

The lockout tagout standard applies to the control of energy during the servicing and maintenance of machines and equipment. Normal production operations are not covered by the standard. Servicing and maintenance that takes place during normal production operations are covered by the standard only if:

- An employee is required to remove or bypass a guard or other safety device.

OR

- An employee is required to place any part of their body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger zone exists during a machine operating cycle.

OSHA has provided an exception. This exception specifies that minor tool changes and adjustments, and other minor servicing activities that take place during normal production operations are not covered by this standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection. The key to this exclusion is that alternative measures must be applied to ensure effective protection is provided to affected employees. Alternative measures may include enabling switches, inch/jog settings, extension tools, etc.

#### **Restoration procedures**

Once the equipment has been locked out, specific procedures are required for restoration of the operation. Normally, only the person who applied the lockout can remove it. If that person is not available, specific procedures and controls should be established by the employer to control the removal of the device. This may be governed by key control procedures, possession, and security of any spare key. Key controls are extremely important to the success of the program.

#### **Program elements**

The lockout/tagout program should outline the scope, purpose, authorization, rules, and techniques to be used for the control of the energy. For some complex operations, a permit system may be a valuable tool in exercising management controls for the program. However, a permit system is only one element of the program. A permit alone is not adequate. A complete program also includes the means to enforce compliance with the program. Some suggestions for program elements are:

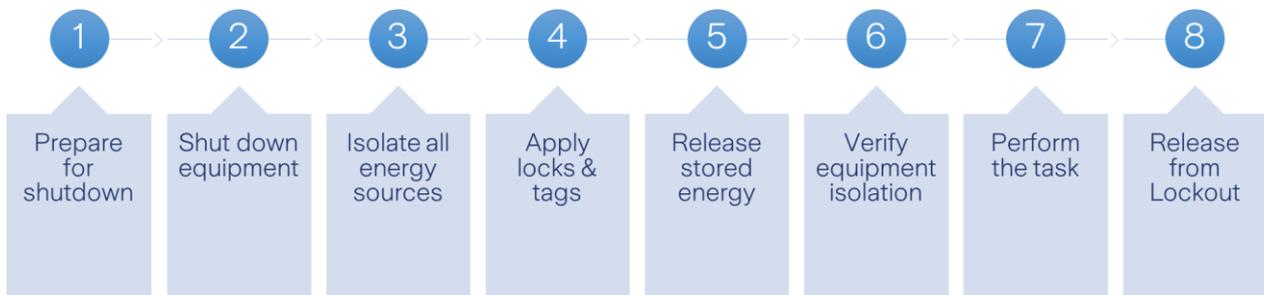
- Outline the intended use of the procedure and who is responsible overall for the program
- Identification by job title or duty of employees who are authorized to perform lockout/tagout activities
- Procedural steps for shutting down, isolating, blocking, and securing machines and equipment to control the energy sources
- Specific procedural steps for placement, removal, and transfer of lockout devices and responsibility for the task
- Specific requirements for testing machines or equipment to verify the effectiveness of the lockout devices
- Identification of protective materials and hardware that are provided for securing the energy sources, including locks, tags, chains, wedges, keys, blocks, adapter pins, self-locking fasteners, or other hardware. These devices should be durable and suitable for the environment in which they are used (damp, corrosive, chemical, etc.). Standardized hardware should be used.
- Proper equipment restoration procedures
- Training and education of employees

The typical minimum procedures outlined in the OSHA standard appear in [Appendix 1 \(OSHA 29 CFR 1910.147\)](#).

## Periodic inspections

The employer shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed.

### Step-by-step requirements (1910.147(d))



## Communication and training

Details of the program should be provided to all employees to ensure they understand the purpose and function of the lockout/tagout program. Employees who may use the lockout/tagout devices should have additional specialized training on recognizing energy sources and the appropriate methods of control. All other employees who work in the area should be trained in the purpose of the program and the procedures and the prohibition of removing any locks or tags. Additional training should be provided when changes in equipment are made or when audits reveal deviations from the program or inadequacies in the program.

## Self-audit

A periodic audit of the program should be conducted at least annually to ensure lockout/tagout procedures are adequate and being followed by all employees. The results of the audit should be documented.

## Conclusion

Establishing an effective lockout/tagout program can help prevent employee injuries and minimize workplace disruptions during equipment repair and maintenance.

For more information on Zurich's extensive Risk Engineering and Sustainability services, please contact your Risk Engineer or visit us at [Risk Engineering and Sustainability Services | Zurich Resilience Solutions](#).

## References

"United States Department of Labor." Control of Hazardous Energy (Lockout/Tagout) - Overview | Occupational Safety and Health Administration, [www.osha.gov/control-hazardous-energy](http://www.osha.gov/control-hazardous-energy). Accessed 7 Aug. 2023.

## Other resources

[1910.147 - OSHA lockout/tagout](#)

[OSHA - Lockout/Tagout](#)

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