

Oregon OSHA
The Hazardous Energy Control
Standard and Lockout/Tagout

STUDENT WORKBOOK

Oregon OSHA

The Hazardous Energy Control Standard and Lockout/Tagout

Presented by Oregon OSHA

Public Education — Our Mission:

We provide knowledge and tools to advance self-sufficiency in workplace safety and health.



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Department of Consumer
and Business Services

Introduction

Many serious injuries and fatalities have occurred when someone thought a machine was safely turned off or assumed all energy sources were correctly disconnected.

This is where the Hazardous Energy Control Standard – Division 2/J 29 CFR 1910.147 – comes in. Routinely referred to as “Lockout/Tagout,” this standard 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 standard sets minimum performance criteria for the control of hazardous energy, requiring all energy sources for equipment be turned off, isolated (disconnected), and physically locked out. Bleeding, relieving, or blocking other stored and residual energy must also be done to achieve a zero-energy state. The last important function is to verify all energy has been deenergized or isolated; equipment or machines must be returned to a zero-energy state before work begins.

Objectives

- Gain a greater awareness of all requirements in the Hazardous Energy Control Standard
- Discuss the importance of a hazardous energy control plan
- Discuss energy control procedures, training, and periodic inspection criteria

The Hazardous Energy Control Standard applies to all Oregon employers, including construction and maritime.

- Refer to Division 4/J for hazardous energy control in agriculture.
- Requirements for installations under the exclusive control of electric utilities for power generation, transmission, and distribution are covered in Division 2/R 29 CFR 1910.269.
- Exposures to electrical hazards from work on, near, or with conductors or equipment in electric utilization installations are regulated in Division 2/S 29 CFR 1910.331-335.



Part 1: Scope and application

The energy control program

The employer must 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, start-up, or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source, and rendered inoperative.

What are the three key elements of an energy control program?

1. _____
2. _____
3. _____

Scope

The Hazardous Energy Control Standard covers the following employees:

- Authorized employees
- Affected employees
- Other employees

The person who operates or uses a machine or equipment being serviced is an:

- a) Authorized employee
- b) Affected employee
- c) Other employee

The person who may occasionally be in the area where lockout procedures are being used is an:

- a) Authorized employee
- b) Affected employee
- c) Other employee

The person who services or performs maintenance on machines and equipment is an:

- a) Authorized employee
- b) Affected employee
- c) Other employee

Procedures must be followed when servicing or maintenance is being done when _____ energization, start-up, or release of stored energy could cause injury.

What is servicing or maintenance?

Some workplace activities considered "servicing or maintenance" include:

- Adjusting
- Inspecting
- Modifying
- Constructing
- Retooling
- Lubricating
- Installing
- Setting up
- Removing jams
- Cleaning

Sources of energy

Brainstorm with the class about the type of energy they may find in their workplaces.

Some examples include:

- Electrical
- Pneumatic
- Gravity
- Hydraulic
- Radiation
- Kinetic

The Hazardous Energy Control Standard

does not apply to:

- Installations under the control of electric utilities for the purpose of power generation, transmission, and distribution (OAR Div 2/R 29 CFR 1910.269)
- Exposure to electrical hazards from work on, near, or with conductors or equipment in electric utilization installations (OAR Div 2/S 29 CFR 1910.331-335)
- Oil and gas well drilling and servicing
- Servicing or maintenance during normal production operations unless:
 - Guards, or other devices are removed or bypassed
 - Employees place themselves in the point of operation (the area of the machine where work is actually performed)
 - Employees place themselves in any area considered dangerous during a machine operating cycle

- Work on _____-and-_____ connected equipment when under the exclusive control of the authorized person
- Hot tap operations involving transmission and distribution systems for gas, steam, and petroleum, when performed on pressurized lines and when the employer demonstrates that:
 - Continuity of service is essential
 - Shutdown of the system is impractical
 - Documented procedures are followed
 - Special equipment is used to provide proven effective protection for employees



Part 2: The hazardous energy control plan

Your hazardous energy control plan must specifically outline the scope, purpose, authorization, rules, and techniques for the control of hazardous energy.

The plan must also include your methods to enforce compliance. At a minimum, the following steps must be taken:

1. A specific statement of the intended use of your procedures
2. Specific procedures to shut down, isolate, block, and secure machines or equipment
3. Specific procedures to place, remove, and transfer lockout/tagout devices

4. Assigning responsibility for lockout/tagout devices
5. Requirements and procedures to test machines and machinery to determine and verify effective lockout/tagout devices, and other energy control measures

Developing a successful plan

1. List all equipment or machines that need servicing or maintenance.
2. Identify the machines that could unexpectedly start up or release stored energy while being serviced or maintained.
3. Determine the steps in the maintenance or servicing task.
4. Review each step for the potential of a hazard from all energy sources.

Why is a comprehensive written plan critical to a successful lockout/tagout program?

What are some reasons a lockout/tagout program may not work effectively?

Who is responsible, who is accountable, and for what?

Part 3: Lockout/tagout procedures

Step 1 – Prepare for lockout

The first step in the lockout/tagout procedure is preparing to shut down the equipment or machinery. Before shutting down, the authorized employee must know:

- The types and magnitudes of energy
- The hazards posed by that energy
- The methods to effectively control the energy

Pay close attention to energy (such as gravity, electrical, and high pressure) that can be stored or re-accumulated after shutdown. Notify all affected employees prior to the shutdown so they can clear their work area or any other area that might be hazardous.

What can you do to ensure the above review and notification is conducted prior to lockout?

Step 2 – Shutdown

Machinery and equipment must be turned off or shut down using the procedures you've established for the machine or equipment.

If more than one authorized employee is involved in a shutdown, a team leader should make sure everyone has accomplished their tasks and are aware that a shutdown will occur.

Step 3 – Energy isolation

All energy isolating devices must be located and operated to completely de-energize and isolate the equipment. The authorized employee will verify operation of each energy-isolating device. If more than one authorized employee is involved, a team leader should make sure everyone has accomplished their task.

An "energy-isolating device" physically prevents the _____ or _____ of energy.

Some examples of energy-isolating devices include:

Push buttons, selector switches, and other control circuit-type devices are energy-isolating devices.

True

False

Step 4 – Lockout or tagout application

What is the difference between lockout and tagout?

“Lockout” is the placement of a lockout device on an energy-isolating device, according to an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

“Tagout” is the placement of a tagout device on an energy-isolating device, according to 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.

Lockout devices

A “lockout device” uses a positive means such as a lock to hold an energy-isolating device in a safe position to prevent the energizing of a machine or piece of equipment.

- Only authorized employees can affix lockout devices.
- Lockout devices must be able to hold energy-isolation devices in a “safe” or “off” position.

Tagout devices

A “tagout device” is a prominent warning, such as a tag and a means of attachment, that can be securely fastened to an energy-isolating device according to 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.



- Only authorized employees can affix tagout devices.
- Tagout devices must be affixed to clearly indicate that the moving of energy-isolating devices from the "safe" or "off" position is strictly prohibited.
- Tagout devices must warn against hazardous conditions if the machine or equipment is energized, and they must include a message such as **"Do Not Start," "Do Not Close," "Do Not Energize," or "Do Not Operate."**
- If a tag cannot be affixed directly to the energy-isolating device, it must be located as close as safely possible to the device so that the tag is obvious to anyone attempting to operate the device.

Which is the preferred method: Lockout or tagout?

An energy-isolating device is "capable of being locked out" if:

- It has a hasp or other means to attach a lock.
- It has a built-in locking mechanism.
- It does not have to be dismantled or rebuilt to achieve lockout.

When can an employer use a tagout system?

- When an energy-isolating device is not capable of being _____
- When the employer can demonstrate that using a tagout system will provide full employee protection

Protective hardware

- Protective hardware must be provided by the _____.
- Each lockout and tagout device must be singularly identified as being used _____ for lockout or tagout.

- Lockout and tagout devices must be _____ within the facility.
- Lockout and tagout devices must _____ the user.

Lockout and tagout devices must be capable of withstanding their environment for the maximum period of time the exposure is expected, and must have the following:

- Be constructed and printed so that exposure to weather conditions or wet, damp locations will not cause the tag to deteriorate or the message on the tag to become illegible
- Tags that will not deteriorate in corrosive environments, such as areas where acid and alkali chemicals are handled and stored

Lockout devices must be substantial enough to prevent removal except with the use of excessive force or unusual techniques (for example, bolt cutters).

Tagout devices must be substantial enough to prevent inadvertent or accidental removal.

Attachment means must be nonreusable, attachable by hand, self-locking, and nonreleasable with a minimum unlocking strength of 50 pounds, and designed equivalent to a one-piece, all-environment-tolerant nylon cable tie.

What are some examples of lockout devices?

Step 5 - Controlling stored energy

Immediately after applying lockout or tagout devices, the authorized employee must ensure all potentially hazardous stored or residual energy is:

- Relieved
- Disconnected
- Restrained

What are some examples of stored or residual energy?

Step 6 – Verify

Before starting work on a machine or piece of equipment that has been locked or tagged out, the authorized employee must _____ that it has been isolated and de-energized.

How do you verify that a machine or piece of equipment is actually isolated and de-energized?

Release from lockout or tagout

The authorized employee must follow these procedures prior to removing a lockout/tagout device:

Equipment

- Make sure machinery or equipment is properly reassembled
- Inspect machinery or equipment to make sure nonessential items have been removed

Employees

- Make sure all employees are safely positioned outside dangerous areas
- Notify affected employees that lockout or tagout devices have been removed and that energy is going to be reapplied

Removing lockout/tagout devices

- Only the authorized employee who applied the lockout or tagout device may remove it.
Exception: When the authorized employee is not available to remove it, the device can be removed under the direction of the employer.
- Specific procedures and training must be developed, documented, and placed in your energy control plan. At a minimum, the procedures must include:
 - Verification that the authorized employee who applied the device is **not** at the facility
 - Making all reasonable efforts to contact the authorized employee to inform them that their lockout or tagout device has been removed
 - Ensuring they are aware of this upon returning to work

If the authorized employee is not available, who is authorized to remove the lockout or tagout device?

Testing and positioning machines or equipment

Whenever lockout or tagout devices must be temporarily removed to test or position the machine or equipment, the following sequence must be conducted:

1. Clear the machine or equipment of tools and materials.
2. Remove employees from the machine or equipment area.
3. Remove the lockout or tagout devices.
4. Energize and proceed with testing or positioning.
5. De-energize all systems and reapply energy control measures.

How can employees be injured while testing the machinery or equipment during maintenance?

Outside personnel

Outside servicing personnel, contracted to perform maintenance or other services requiring lockout or tagout procedures, must not begin work until the host employer and the contractor inform each other of their respective hazardous energy control procedures.

The host employer must also ensure company employees understand and comply with the contractor's lockout or tagout procedures.

What does this involve?

Who is responsible if an employee is injured because an outside contractor did not follow lockout/tagout procedures?

Shift and personnel changes

Specific procedures must be used during shift or personnel changes to ensure the _____ of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between departing and oncoming workers.

What is the intent of these shift change procedures?

Group lockout and group tagout

When servicing or maintenance is performed by a group, the group must use a procedure for employee protection equivalent to that provided by a personal lockout or tagout device.

Group lockout or tagout devices must be used according to specific procedures and must include the following requirements, at a minimum:

- Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device.
- Provision for the authorized employee to monitor the exposure of individual workers to the lockout or tagout of the machine or equipment.

- When more than one group is involved, assignment of overall lockout or tagout control responsibility to an authorized employee designated to coordinate all affected groups, and ensure continuity of protection.
- Each authorized employee must affix a personal lockout or tagout device to the group lockout device (group lockbox or comparable mechanism) when the authorized employee begins work, and must remove the device when the authorized employee stops working on the machine or equipment is being serviced or maintained.

Part 4: Lockout/tagout training

General requirements

Training must ensure that the purpose and function of your energy control plan are understood and that employees gain the knowledge and skills to safely apply, use, and remove hazardous energy controls. Minimum training must include:

Authorized employees

Authorized employees must be able to recognize:

- Hazardous energy sources
- Types and magnitudes of energy in the workplace
- Methods and means necessary to isolate and control the energy

Affected employees

Affected employees must be instructed on the purpose and use of your energy control procedures.

Other employees

Other employees must be instructed about:

- The energy control procedure in general
- Prohibitions relating to attempts to restart/reenergize equipment

What are effective training types for each level of training?

(May be more than one)

- Authorized employee:

- Affected employee:

- Other employee:

What are some other training considerations?

- _____
- _____
- _____
- _____
- _____

Training on tagout devices

If tagout devices are used, further training needs to emphasize that:

- Tags are warning devices only; they do not provide a physical restraint that lockout devices provide.
- Tags must not be removed without the authorized employee's approval and should never be bypassed or ignored.
- Tags must be legible and comprehensible by all employees.
- Tags must be able to withstand environmental conditions in the workplace.
- Tags may give employees a false sense of security.
- Tags must be securely attached to prevent accidental detachment.

Retraining

When should employees be retrained?

- Whenever there is a change in their jobs or _____.
- Whenever there is a change in _____, equipment, or processes that present a new hazard.
- Whenever there is a change in your energy _____.
- Whenever there are deviations from or inadequacies in the _____ knowledge or use of the energy control procedures.

The retraining must reestablish employee proficiency, and introduce new or revised control methods and procedures as necessary.

Documentation

A training certification must contain each employee's name and training date.

What's missing?

Part 5: Lockout/tagout periodic inspections

An inspection of each energy control procedure must be conducted at least annually. These inspections must include a demonstration of the procedures and may be implemented through random audits or planned visual observations.

- Inspections must be performed by an authorized employee other than the one using the energy control procedure being inspected.
- The purpose of the inspection is to correct deviations or inadequacies relating to the procedures or training.

- Where lockout is used, the inspector and authorized employees involved in the procedure being inspected must review applicable controls and responsibilities.
- Where tagout is used, the inspector and each authorized and affected employee involved in the procedure being inspected must review applicable controls and responsibilities, and the limitations a tagout system provides.

Documentation

The employer must certify that the periodic inspections are being performed. This certification must identify:

- The equipment or machine being serviced
- The inspection dates
- The employees included in the inspection
- The authorized employee performing the inspection

What's missing?

- _____
- _____
- _____

What questions would you consider when conducting your inspection?

How often must lockout/tagout inspections occur?

Who must conduct the inspection?

Notes

Oregon OSHA services

Oregon OSHA offers a wide variety of safety and health services to employers and employees:

Appeals

► **503-378-3272**

- Discusses Oregon OSHA's requirements and clarifies workplace safety or health violations.
- Discusses abatement dates and negotiates settlement agreements to resolve disputed citations.

Conferences

► **503-378-3272; oregon.conferences@dcbs.oregon.gov**

- Hosts, co-hosts, and coordinates conferences throughout Oregon that enable employees and employers to learn and share ideas with local and nationally recognized safety and health professionals.

Consultations and Evaluations

► **503-378-3272; 800-922-2689; consult.web@dcbs.oregon.gov**

- Offers no-cost, on-site safety and health assistance to help Oregon employers recognize and correct workplace safety and health problems.
- Provides consultations in the areas of safety, industrial hygiene, ergonomics, occupational safety and health programs, assistance to new businesses, the Safety and Health Achievement Recognition Program (SHARP), and the Voluntary Protection Program (VPP).

Enforcement Information

► **503-378-3272; 800-922-2689; enforce.web@dcbs.oregon.gov**

- Offers pre-job conferences for mobile employers in industries such as logging and construction.
- Inspects places of employment for occupational safety and health hazards and investigates workplace complaints and accidents.
- Provides abatement assistance to employers.

Public Education and Training

► **503-947-7443; 888-292-5247, Option 2; ed.web@dcbs.oregon.gov**

- Provides workshops and materials covering management of basic safety and health programs, safety committees, accident investigation, technical topics, and job safety analysis.

Standards and Technical Resources

► 503-378-3272; 800-922-2689; tech.web@dcbs.oregon.gov

- Develops, interprets, and gives technical advice on Oregon OSHA's safety and health rules.
- Publishes safe-practices guides, pamphlets, and other materials for employers and employees.
- Manages the Oregon OSHA Resource Center, which offers safety videos, books, periodicals, and research assistance for employers and employees.

Need more information? Call your nearest Oregon OSHA office.

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541-276-9175

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Consultation: 503-229-6193

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