

Lock-out and Tag-out on Industrial Equipment



TUV Rheinland
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What is lockout/tag out?

“Lockout/tag out” refers to specific practices and procedures to safeguard workers from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities. This requires, in part, that a designated individual turns off and disconnects the machinery or equipment from its energy source(s) before performing service or maintenance and that the authorized worker either locks or tags the energy-isolating device(s) to prevent the release of hazardous energy and take steps to verify that the energy has been isolated effectively. If the potential exists for the release of hazardous stored energy or for the reaccumulation of stored energy to a hazardous level, steps must be taken to prevent injury that may result from the release of the stored energy.

Lockout devices hold energy-isolation devices in a safe or “off” position. They provide protection by preventing machines or equipment from becoming energized because they are positive restraints that no one can remove without a key or other unlocking mechanism, or through extraordinary means, such as bolt cutters. Tag out devices, by contrast, are prominent warning devices that an authorized worker fastens to energy-isolating devices to warn others not to reenergize the machine while he or she services or maintains it. Tag out devices is easier to remove and, by themselves, provide less protection than do lockout devices.

Why do I need to be concerned about lockout/tag out?

Workers can be seriously or fatally injured if machinery they service or maintain unexpectedly energizes, starts up, or releases stored energy. OSHA’s standard on the Control of Hazardous Energy (Lockout/Tag out), found in *Title 29 of the Code of Federal Regulations (CFR) Part 1910.147*, spells out the steps equipment owners must take to prevent accidents associated with hazardous energy. The standard

addresses practices and procedures necessary to disable machinery and prevent the release of potentially hazardous energy while maintenance or servicing activities are performed.

If a service or maintenance activity is part of the normal production operation, the workers performing the servicing may be subjected to hazards not normally associated with the production operation itself. Although machine guarding provisions in Subpart O of 29 CFR 1910 cover most normal production operations, workers doing service or maintenance activities during normal production operations must follow lockout/tag out procedures if they:

- Remove or bypass machine guards or other safety devices,
- Place any part of their bodies in or near a machine’s point of operation, or
- Place any part of their bodies in a danger zone associated with machine operations.

Work involving minor tool changes and adjustments or other minor servicing activities that are routine, repetitive, and integral to the use of the production equipment and that occur during normal production operations are not covered by the lockout/tag out standard. This exception is limited, however, and applies only when economic considerations prevent the use of prescribed energy-isolation measures and when the employer provides and requires alternative measures to ensure effective, alternative protection.

Whenever the standard is applicable, the machinery must be shut off and isolated from its energy sources, and lockout or tag out devices must be applied to the energy-isolation devices. In addition, the authorized worker must take steps to verify that he or she has effectively isolated the energy. When there is stored or residual energy, the authorized worker must take steps to render that energy safe. If the possibility exists for reaccumulation of stored energy to hazardous levels, the equipment owner must ensure that the worker(s) perform verification steps regularly to detect such reaccumulation before it has the potential to cause injury.

Equipment owners must establish an energy-control program to ensure that workers isolate machines from their energy

sources and render them inoperative before any one service or maintains them. As part of an energy-control program, equipment owners must:

- Establish energy-control procedures for removing the energy supply from machines and for putting appropriate lockout or tag out devices on the energy-isolating devices to prevent unexpected reenergization. When appropriate, the procedure also must address stored or potentially reaccumulated energy;
- Train workers on the energy-control program, including the safe application, use, and removal of energy controls; and
- Inspect these procedures periodically (at least annually) to ensure that they are being followed and that they remain effective in preventing exposure to hazardous energy.

What must workers do before they begin service or maintenance activities?

Before beginning service or maintenance, the following steps must be accomplished in sequence and according to the specific provisions of the employer’s energy-control procedure:

1. Prepare for shutdown;
2. Shut down the machine;
3. Disconnect or isolate the machine from the energy source(s);
4. Apply the lockout or tag out device(s) to the energy-isolating device(s);
5. Release, restrain, or otherwise render safe all potential hazardous stored or residual energy. If a possibility exists for reaccumulation of hazardous energy, regularly verify during the service and maintenance that such energy has not reaccumulated to hazardous levels; and
6. Verify the isolation and deenergization of the machine.

What must workers do before they remove their lockout or tag out device and reenergize the machine?

People who work on deenergized machinery may be seriously injured or

killed if someone removes lock-out/tag out devices and reenergizes machinery without their knowledge. Thus, it is extremely important that all lockout and tag out devices are respected and that only the person(s) who applied these devices remove them.

Before removing lockout or tag out devices, the workers must take the following steps in accordance with the specific provisions of the equipment owner's energy-control procedure:

- Inspect machines or their components to assure that they are operationally intact and that non-essential items are removed from the area; and
- Check to assure that everyone is positioned safely and away from machines.

After removing the lockout or tag out devices but before reenergizing the machine, the worker must assure that all persons who operate or work with the machine, as well as those in the area where service or maintenance is performed, know that the devices have been removed and that the machine is capable of being reenergized. (See Sections 6(e) and (f) of 29 CFR Part 1910.147 for specific requirements.) In the rare situation in which the person who placed the lockout/tag out device is unable to remove that device, another person may remove it under the direction of the equipment owner, provided that the equipment owner strictly adheres to the specific procedures outlined in the standard. (See 29 CFR 1910.147(e)(3).)

When do I use lockout and how do I do it?

You must use a lockout program (or tag out program that provides a level of protection equal to that achieved through lockout) whenever your service or maintenance operations are performed on machines that are capable of being locked out and that expose them to hazardous energy from unexpected energization, startup, or release of

stored energy. The primary way to prevent the release of hazardous energy during service and maintenance activities is by using energy-isolating devices such as manually operated circuit breakers, disconnect switches, and line valves and safety blocks. Lockout requires use of a lock or other lockout device to hold the energy-isolating device in a safe position to prevent machinery from becoming re-energized. Lockout also requires workers to follow an established procedure to ensure that machinery will not be reenergized until the same person who placed the lockout device on the energy-isolating device removes it.

How can I determine if the energy-isolating device can be locked out?

An energy-isolating device is considered "capable of being locked out" if it meets one of the following requirements:

- Is designed with a hasp or other part to which you can attach a lock such as a lockable electric disconnect switch;
- Has a locking mechanism built into it; or
- Can be locked without dismantling, rebuilding, or replacing the energy-isolating device or permanently altering its energy-control capability, such as a lockable valve cover or circuit breaker lockout.

What are the requirements for lock-out/tag out devices?

Whether lockout or tag out devices are used, they must be the only devices the equipment owner uses in conjunction with energy-isolating devices to control hazardous energy. These devices must be singularly identified and not used for other purposes. In addition, they must have the following characteristics:

- Durable enough to withstand workplace conditions. Tag out devices must not deteriorate or become illegible even when used with corrosive components such as acid or alkali chemicals or in wet environments.
- Standardized according to color, shape, or size. Tag out devices also must be standardized according to print and format. Tags must be legible and understandable by all employees. They must warn employees about the hazards if the machine is energized, and offer employees clear instruction such as: "Do Not Start," "Do Not Open," "Do Not

Close," "Do Not Energize," or "Do Not Operate."

- Substantial enough to minimize the likelihood of premature or accidental removal. Employees should be able to remove locks only by using excessive force with special tools such as bolt cutters or other metal-cutting tools. Tag attachments must be non-reusable, self-locking, and non-releasable, with a minimum unlocking strength of 50 pounds. Tags must be attachable by hand, and the device for attaching the tag should be a one-piece nylon cable tie or its equivalent so it can withstand all environments and conditions.
- Labeled to identify the specific employees authorized to apply and remove them.

Since lock-out and tag-out can potentially save people's lives, TUV Rheinland makes sure that during its field evaluation activities, the availability of suitable and OSHA compliant lock-out and tag-out mechanisms are available on the machines and that adequate procedures are in place and are being adhered to.

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