

What's at stake



The assured equipment grounding conductor program covers all cord sets, receptacles which are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug. The required quarterly tests must be recorded in our quarterly inspection logs. Electrical equipment must also be visually inspected for damage or defects before each day's use. Any damaged or defective equipment must not be used by the employee until repaired.

What's the Danger?

Use of damaged electrical equipment (power tools, extension cords, etc.) poses a risk for everyone. Be aware and look out for the following:

- Power tools that have three prongs (hot, neutral and ground) may have the grounding pin missing. This is an extremely hazardous situation because if a short develops in the tool, the user may become the ground in the system and electricity will travel through him or her.
- Sometimes during use, the third prong, or the grounding pin, may become loose or fall out. No one should be allowed to bypass the grounding pin by bending it out of the way or removing it completely.
- Flat-wire cords are prohibited from use on construction sites because they do not provide the protection that double-insulated cords do. Look out for any damage to the insulation of cords.
- Double-insulated tools should be used. This generally means the tool is encased in plastic, which will prevent the user from electrocution if the tool develops a short circuit. If there are any defects, such as insulation missing from a cord or a piece of the protective shell broken from the tool, workers are put at risk for electrocution.



These common problems all lead to faulty or improper grounding of electrical equipment.

Here are the effects improper grounding has on humans – by Milliampere (mA):

1. 1mA: Slight tingling sensation, but dangerous when combined with water or moisture
2. 5mA: Slight electric shock resulting in involuntary actions, which lead to injury
3. 6mA - 16mA: Painful shock resulting in loss of muscular control
4. 17mA – 99mA: Extremely painful shock, respiratory arrest, severe muscular contractions, inability to “let go” of contact point which can lead to death
5. 100mA – 2000mA: Ventricular fibrillation (uneven, uncoordinated pumping of the heart) resulting in muscular contraction and nerve damage
6. 2000mA and up: Cardiac arrest, internal organ damage, severe burns and death.



2000mA = 2amps! Your basic home outlet is rated for 15amps.







TESTING EQUIPMENT

When checking electrical equipment, 2 tests are required. One is a Continuity Test to ensure that the equipment grounding conductor is electrically continuous. It must be performed on all cord sets, receptacles which are not part of the permanent wiring of the building or structure, and on cord and plug-connected equipment which is required to be grounded. This test can be performed using a simple continuity tester, such as a lamp and battery, a bell and battery, an ohm meter, or a receptacle tester.

The other test is a GFI Test that must be performed on receptacles and plugs to ensure that the equipment grounding conductor is connected to its proper terminal. This test can be performed with the same equipment used in the first test.



These tests are required before the first use, after any repairs, after damage is suspected to have occurred, and at every annual quarter or 3-month intervals thereafter. Any equipment which fails to pass the required tests shall be placed out of service and not be made available for use by employees. Once all cord sets, corded power tools and equipment has been inspected and tested, they should be tagged as to when the testing was conducted to track frequency. We use color code labeling system using colored tape to mark equipment.

Jan.-Mar.		White
April-June		Green
July-Sept.		Red
Oct.-Dec.		Orange



Monthly Refresher Training

LOCKOUT TAGOUT

July Week 2

LOCKOUT/TAGOUT SAFETY

Many people have been seriously injured or killed by machinery and electrical equipment. Often, these tragedies happen because people try to repair or maintain the equipment without making sure its energy source has been shut off. To prevent this type of tragedy we use the procedures that are called “lockout/tagout.”

The key to lockout/tagout is to make sure that the equipment you are about to work on is completely shut down. Before you begin the shutdown, however, make sure you know what you’re dealing with. You must know the type and magnitude of the energy you’re working with, as well as the potential hazards and the proper way to control that energy. Once you know that, you must inform all affected employees that you are going to shut down the machine.

Lockout/Tagout/Tryout:

Lockout/Tagout/Tryout is a procedure that is designed to protect you from accidental or unexpected startup of equipment.

This procedure serves four important purposes:

- To protect the person working on the equipment;
- To protect other workers in the area;
- To protect the equipment; and
- To serve as a communication device for the above three. This is usually done in conjunction with a safe work permit.

LOTO Is Required When:

- Servicing or maintaining energized equipment;
- Safety guards are removed or bypassed; and
- A worker has to place any part of his or her body in the equipment’s point of operation.

Locking out:

Lockout means much more than simply shutting off a machine by throwing a switch. When a machine has been locked out, it means that all energy to the machine has been shut off (there may be more than one type of energy) any energy that has been stored has been released or blocked. The machine is literally locked out and cannot be restarted or released accidentally.

In lockout, a lock is placed on the part of the machine that controls the energy, such as a circuit breaker, switch, or valve. The lock itself cannot be used for any other purpose. That means you can’t use just any lock you might find in the workplace to perform a lockout – in fact, all lockout locks shall be of the same appearance so people can easily recognize them for what they are (e.g., by color, brand, etc.). The lock must be strong and sturdy enough to stay in place until it’s time for it to be unlocked.

Most important, lockout can be performed only by employees who are trained and certified by the company to do so (known as “authorized” employees). The name of the authorized employee should appear on the lock or tag.

Affected employees are those whose job required them to operate equipment or be in an area where lockout/tagout might be required. They need to understand lockout procedures and why they are important. They should know never to perform a lockout themselves or try to restart locked out equipment.



Tagging out:

“Tagging out” means placing a warning tag or sign on an energy-isolating device. Tagout devices don’t provide the same physical barrier to hazardous energy as lockout devices, so it’s harder to ensure that they are equally effective.

Trying out:

The “Tryout” requires that you physically attempt to turn on all power switches and devices once the equipment has been locked out. This is your final check and assurance that the equipment has been isolated from all power sources.

Procedures:

Lockout involves certain specific procedures, including:

- **PREPARE** – Before you begin, be sure you know all the types of energy involved, hazards presented by energy, and how to control the energy.
- **SHUTDOWN** – Turn off machine or equipment.
- **ISOLATE** – Isolate the machine or equipment from its energy source(s). (For example, turn off main circuit breaker.)
- **LOCKOUT** – Apply your lock. Be sure that it holds the isolating device in the “off” or “safe” position.
- **RELEASE** – Release stored energy. Relieve, disconnect, restrain, block, or otherwise ensure, that all energy sources – electrical, mechanical, hydraulic, compressed, etc. – are de-energized.
- **VERIFY** – Try the on-off switch or other controls to be sure the machine won’t start. Return the switch to the “off” position.

Common causes of accidents:

- The machine or piece of equipment was not completely shut off before a maintenance or repair operation. Not only must the machine be turned off but also the power source that goes to it.
- The machine was turned on accidentally, either out of carelessness or because the person who turned it on didn’t realize that another worker was there and could get hurt.
- The machine wasn’t working correctly but wasn’t fixed, turned off, locked or tagged, and someone who didn’t know about the problem used it.
- Moving equipment wasn’t blocked.
- Safety procedures were inadequate or hadn’t been properly explained.

Prevent accidental injury:

- Ensure you know all the energy that could affect the task (electric, gravity, water, pneumatic, hydraulic, steam, etc.)
- Ensure you control the accidental release of the energy prior to working on the equipment through lockout, tagout, or alternative measures identified for your specific equipment.
- Never reach into moving equipment. Even in the blink of an eye, you could have a life changing injury.
- Test the energy after you believe it to be isolated. This is one of the most overlooked steps and probably the most important. Employees think they have isolated the energy at the source, but it hasn’t been for one reason or another.
- Be aware of your personal safety and the safety of others when working with or around moving equipment and machinery. Always follow proper lockout and tagout procedures, even for a quick or minor repair!

IF IN DOUBT...LOCK IT OUT!!

STEPS OF LOCKOUT/TAGOUT SAFETY

A lockout/tagout procedure should include the following six steps:

- 1-PREPARATION
- 2-SHUTDOWN
- 3-ISOLATION
- 4-APPLYING LOCKS/TAGS
- 5-RELEASE STORED ENERGY
- 6-VERIFICATION



LOCKOUT/TAGOUT STEP 1 - PREPARATION

The first step of locking and tagging out equipment for service and maintenance is to prepare. During the preparation phase, the authorized employee must investigate and gain a complete understanding of all types of hazardous energy that might be controlled. In addition, it's important to identify the specific hazards and of course means for controlling that energy.

LOCKOUT/TAGOUT STEP 2 – SHUT DOWN

With planning complete, the actual process of powering down and locking out machines begins. At this point, it's time to shut down the machine or equipment that will be serviced or maintained. Another important part of this step is to inform all affected employees, even if they won't play a role in the service or maintenance.

LOCKOUT/TAGOUT STEP 3 – ISOLATION

The next step of the lockout/tagout procedure is to isolate the machine or equipment from any source of energy. This may mean any number of things, such as turning off power at a breaker or shutting a valve.

LOCKOUT/TAGOUT STEP 4 – APPLY LOCKS/TAGS

With the machine or equipment isolated from its energy source the next step of lockout/tagout is to actually lock and tag out the machine. It's fair to say that this entire six-step process takes its name from this step.

During this step, the authorized employee will attach lockout and/or tagout devices to each energy-isolating device. The point is to apply the lockout device on the energy-isolating device in a way so it says in the "safe" position and cannot be moved to the unsafe position except by the person performing the lockout.

Tagout refers to applying a tag on the device as well. This tag includes the name of the person who performed the lockout and additional information.

Lockout/Tagout step 5 – releasing stored energy

Even after the energy source has been disconnected, in step 3 of the lockout safety process, and the machine has been locked out, in step 4, that doesn't entirely guarantee that there's no hazardous energy still stored within the machine or that it's safe to perform maintenance.

At this time, it's important to look for any hazardous energy that's been "stored" within the machine, or any "residual" energy. During this phase, any potentially hazardous stored or residual energy must be relieved, disconnected, restrained, or

made non-hazardous in some other way.

LOCKOUT/TAGOUT STEP 6 – VERIFICATION OR TRY

This last step is all about making sure.

Yes, you've shut down the machines, isolated them from their source of power, locked them out, and checked for hazardous stored energy. But now's the time to double-check that you did it all right and it's now safe to work on the machine or equipment.

At this point, an authorized employee verifies the machine has been properly isolated and de-energized. Lock is your personal lock that can only be opened with your key. Once you apply the lock or other restraint device, you have to tag it.

Locks and tags must indicate:

- Who you are
- Who you work for
- The date when the lock was applied.

Once each energy source has been locked out and tagged, you must test the equipment to verify a zero-energy state.



TRAINING

All employees must know basic Lockout Tagout concepts.

They should also know what tasks might expose them to hazardous energy and how it can be controlled. Training requirements depend on whether employees service equipment or just work near it while it is being serviced.

Authorized employees service equipment and affected employees work in areas where the equipment is serviced need to know:

- How to identify and isolate hazardous energy sources
- How to identify the types and magnitudes of energy used in the workplace

Affected employees simply work near Lockouts. Need to know:

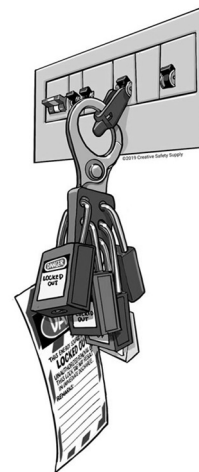
- The purpose of energy control procedures
- How energy control procedures are applied
- How energy control procedures will protect them



ABANDONED LOCK PROCEDURE

It is the responsibility of the authorized employee to remove his/her lock at the end of the workday. If an authorized employee forgets to remove his/her lock before leaving the worksite, the immediate supervisor must:

1. Call the authorized employee to verify the employee has left the worksite and inform him/her that their lock is being removed.
2. Lockout tagout devices may not be removed unless the responsible supervisor is present and authorizes removal.
3. The supervisor must make all reasonable attempts to contact the employee and inform him/her that their lock has been removed. If the authorized employee cannot be contacted via home phone, cell phone, emergency contact, the time card has been checked, and the supervisor has verified that the employee who applied the device is not at the facility, the energy to the equipment may be restored after performing an inspection of the equipment that has been locked out.
4. The supervisor must then ensure that the authorized employee is made aware of the removal during roll call the morning of the employee's return and prior to employee resuming work.
5. After completion of the inspection and the equipment is found to be in safe working order, the equipment may be restored.
6. The abandoned lock procedure form found in Appendix A must also be filled out and filed by the immediate supervisor. (This form can also be found in the "forms" section of the Safety and Health Procedure Manual)





Abandoned Lock Procedure Form

Note: Only supervisors can remove abandoned locks.

Requester: _____ Title: _____ Date: _____

Name on Tag: _____ Lock Number _____

Reason for Removal:

Why is it critical to remove this lock now?

Has an attempt been made to contact employee? YES NO

- By phone YES NO
 - What number was called? _____
- Time card checked YES NO

If not by phone, how?

If unable to contact employee, how will employee be notified of lock removal?

At a minimum, the supervisor must ensure that the authorized employee is made aware of the removal during roll call the morning of the employee's return and prior to employee resuming work.

Are you sure it is safe to remove this lock? YES NO

Supervisor _____ Date: _____

Superintendent (if Applicable) _____ Date: _____

Client Personal (if Applicable) _____ Date: _____

Key and Lock Returned to Safety Department? YES NO