

Student Reference Guide

Why is this information important to you?

Because there is an enormous amount of information related to machine related injuries supporting the need to control dangerous energy sources during maintenance, servicing and repair. There are laws requiring energy control practices and it makes sense to prevent the accidents we know will happen if personal control of machinery is not secured during these necessary activities.

References: ▪ **OSHA 29 CFR 1910.147** (and State OSHA Lockout Regulations) ▪ **ANSI Z244.1** (2014)

Main causes of machinery accidents

- Accidental Restarting of Equipment during servicing or repairs
- Failure to Stop Equipment
- Failure to Disconnect From Power Sources
 - Failure to Dissipate Residual Energy
- Failure to secure power sources with locks
- Failure to Clear Work Areas Before Reactivation
- Insufficient guarding of dangerous machinery
- Nonexistent (or removed) machine guarding
- Poorly designed/installed machine guarding
- Defeat of presence sensing safety devices

Types of Energy Sources:

- Electrical
- Pneumatic
- Hydraulic
- Mechanical
- Gravity (Kinetic Energy)
- Chemical Energy
- Thermal (steam, hot water)
- Stored (Potential) Energy for all sources

Lockout must be applied - When one or more people will be servicing or repairing machinery or equipment - AND – It is possible that an unexpected machinery start-up or release of stored energy could cause injury to personnel.

Apply lockout anytime: You need to remove or bypass machine guards or other safety devices resulting in exposure to point of operation hazards - OR – You need to place any part of your body in contact with the point of operation of the operational machine or piece of equipment - OR – you need to place any part of your body into a danger zone within a machine operating cycle.

Exceptions: ▪ Minor servicing to support production ▪ Single energy source Cord & Plug Equipment

Remember - Unjamming and cleaning equipment make up almost 60% of sudden startup accidents

A Lockout Energy Control Program consists of 4 Elements

- Program Guidelines & Documentation
- Training & Communication
- Machine specific lockout procedures
- Periodic Inspection

A written program commonly addresses: Purpose, Scope and Application of Lockout, Responsibilities, Lockout procedures, Equipment access, Training, Audits/inspections and a Disciplinary policy for breaches.

Machine specific procedures: outline the appropriate steps that must be completed to adequately lockout each piece of equipment. These include the rules, regulations, and techniques employed in the control of hazardous energy including steps for:

- Shutting down, isolating, blocking and securing machines or equipment to control hazardous energy
- Placement, removal and transfer of lockout devices or tagout
- Instructions for testing equipment to verify the effectiveness of lockout devices and to verify the energy control measures worked.
- **Exception:** Single energy source machines meeting all 8 OSHA requirements must be locked out but a written procedure is not required to be completed.

LOCKOUT TRAINING FOR AUTHORIZED PERSONNEL

Seven Steps to Apply Lockout:

1. Prepare for Shutdown
2. Notify Affected Employees
3. Shutdown Equipment
4. Isolate Energy Sources
5. Apply Lockout Devices
6. Release Stored Energy
7. Verification testing

Remember – Always Test, Try, Verify...

Testing or positioning machinery - Temporary remove locks and re energization of the equipment ONLY when power is needed for the testing or positioning of the machinery. If additional work is needed following testing, re-isolate the machine from the energy source, and re-apply lockout devices according to the Lockout procedure before resuming repairs.

Five Steps to Remove Lockout:

1. Remove tools & replace guards
2. Check for Employees
3. Remove Lockout
4. Notify Affected Employees
5. Restore Energy

Group Lockout

- **Hasp:** Isolate each energy source with a group hasp, and then by a personal lock placed by each Authorized worker participating in the task.
- **Group Box:** The Authorized Lockout Leader is responsible for locking out the equipment according to the written procedure to ensure the protection for all others participating in the work to be done.
- Group locks are placed at all energy control points and the control keys get placed in a group lockbox which is then secured by the Lockout Leader by placing their personal lock to secure the control keys
- As a participating Authorized employee, you need to verify the proper lockout procedure has been followed to provide a zero energy condition in the machinery you will be working on before adding your personal lock to the group lockbox to secure the keys to the control locks.
- You must remove your personal lock(s) as soon as you stop working on the equipment being serviced.

Shift or Personnel Change - The orderly transfer of lockout device protection between outgoing and incoming workers minimizes exposure to hazards from the unexpected release of stored energy. Changes in task must be coordinated and Lockouts are changed in person to assure continuity of protection and to avoid leaving behind lockout devices that could become a removal problem.

- Be sure to notify incoming Affected Employees that lockout is in place
- Be sure to re-test all operating controls to verify energy is truly neutralized

Contractors / Outside Personnel - Understand how to work cooperatively with contractors – especially if they are not familiar with your Lockout program or you are asked to work in cooperation with theirs.

Emergency Removal of Lockout - Lockouts should only be removed by the person who applied them.

Be sure no ongoing work will be done on equipment you have locked out – or the emergency removal procedure may require you to return to the facility after hours. This is considered a breach of the program.

Training for Authorized Employees – You need to be able to recognize the type and magnitude of hazardous energy sources in your facility, and the methods and equipment needed to isolate and control those energy sources to protect yourself while maintaining, servicing or repairing equipment. There may be additional responsibilities required of you according to the Lockout program for your workplace.

Periodic Inspections/Audits and Re-Training – Annual documented evaluations are performed to be sure that energy control procedures are accurate and are being properly used by Authorized personnel. Re-Training is performed whenever changes in; job assignments, equipment, procedures take place or when there are problems recognized with the employee's knowledge or use of the energy control procedures.