



Title: LOTO (Lock Out Tag Out) System

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1.0 OBJECTIVE:

To lay down a Procedure for LOTO (Lock out/ Tag out) System in the organization.

2.0 SCOPE:

This SOP is applicable to the LOTO (Lock out/ Tag out) standard for proper lock out system.

3.0 RESPONSIBILITY:

Officer/Executive–EHS & Engineering: Drafting & Training of SOP.

Officer/Executive-QA: Distribution (To concern Departments) of SOP.

4.0 ACCOUNTABILITY:

Head-QA: For Approval of SOP.

Head- EHS: For Checking, Training & Effective implementation of SOP.

Responsible for providing technical and regulatory expertise and assisting in program development, implementation and assessment.

Head-Concern Department: Effective implementation of SOP.

Responsible to comply with the organization's Lock/Tag/Try Procedure.

5.0 ABBREVIATIONS:

SOP : Standard Operating Procedure
QA : Quality Assurance
EHS : Environment Health & Safety
LOTO : Lockout/ Tag out
PPEs : Personnel Protective Equipment's

6.0 PROCEDURE:

6.1 DEFINITION:

6.1.1 Authorized Person: An individual qualified to perform a lockout procedure by virtue of training and demonstrated competency.

6.1.2 Affected Person: Anyone who either works or may work in an area where a lockout procedure is performed.



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- 6.2 Control Circuit:** The control circuit carries electrical signals that direct the performance of the equipment, but does not carry the main power current.
- 6.3 Energy Isolating Device:** A mechanical device that physically prevents the transmission or release of energy. Examples of energy isolating devices include: a manually operated electrical circuit breaker; a manually operated primary electrical disconnect switch; a line valve, blank, or blind; or any similar device used to block or isolate energy. The term does not include a push button, selector switch, and other electrical control circuit type devices. All energy isolating devices must be permanently and clearly labeled to identify the specific name, or section, of the equipment or process that it isolates.
- 6.4 Exclusive Control:** A cord and plug set that is both visible to and within arm's reach of the exposed individual, and is the only power source to the equipment.
- 6.5 Delayed Restart and Warning Alarm:** A system whereby the start button must be pushed and an audible and/or visual warning alarm must actuate for a minimum of five seconds before the equipment will begin to run. The purpose of the audible warning alarm is to adequately warn employees in the vicinity that the equipment is about to start.
- 6.6 Intermediate Energy State (IES) :** A state of energy in a piece of equipment or process in which designated hazardous energy sources are at Zero Energy State (ZES), while maintaining other designated energies to perform specific non-hazardous tasks or functions. For example, a setup on a piece of equipment in which the main drive motors and equipment closing motors are at ZES and locked out, yet the non-hazardous crawl motors are operational so that the equipment can be set, adjusted and prepared for operation.
- 6.7 Lockout:** The placement of a lockout device on an energy isolating device ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.
- 6.8 Lockout Device :** A device that uses a positive means, such as a lock, chain and lock combination, etc., to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Lockout devices must be identified, standardized, durable, substantial, and may not be used for any other purpose.
- 6.9 Machine Specific Lockout Procedure:** A document that lists all sources of energy and the associated energy isolation points for a specific piece of equipment or process, as well as the steps to effectively de-energize and reenergize the system. These procedures shall be readily available for all equipment, except small hand-held portable devices and appliances, such as drills, coffee pots, microwave ovens, radios, laptop computers, fans, etc. Where appropriate, a common Machine Specific Lockout Procedure can be developed for a group of similar pieces of equipment. As a minimum, these procedures must include: the name of either the individual equipment or group of equipment covered by the procedure, the types of energy involved, the specific steps to be followed to isolate the



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equipment, the name (on the permanent label) and location of all isolation points, the method to verify that the equipment has been properly isolated, and the last revision date.

- 6.10 Main or Local Disconnect Switch:** The main or local switch that controls power to a piece of equipment. By opening either the main or local disconnect switch, the equipment is positively isolated from the power source. While main disconnect switches may be located almost anywhere, they are usually located in a motor control center. Local disconnects are normally adjacent to the piece of equipment being locked out.
- 6.11 Servicing or Maintenance:** Workplace activities such as constructing, installing, setting-up, adjusting, inspecting, lubricating, modifying, servicing, and maintaining machines or equipment.
- 6.12 Tag:** A means of providing identification concerning a lockout device. Tags are not to be used in lieu of a positive means to isolate energy, such as, a lock, blank, chain and lock combination, and other similar devices. Tags must be standardized throughout the facility, substantial enough to prevent inadvertent or accidental removal, and constructed so that exposure to weather or environmental conditions will not cause the tag to deteriorate or the message on the tag to become illegible.
- 6.13 Two-Step Restart:** A system whereby two unique steps must be completed in order to start a piece of equipment. For example, to start a piece of equipment a person must: (a) press the “start” button, wait a few seconds, then press it again within a few second window of opportunity, or (b) pull out a mushroom headed “stop” button and then push a “start” button. The purpose of the two-step restart is to force a person to think about what they are doing before starting a piece of equipment.
- 6.14 Zero Energy State (ZES):** Where all the energy sources (electrical, mechanical, hydraulic, pneumatic, chemical, thermal, kinetic, and any other form of energy) are properly removed or protected by use of the Lock/Tag/Try Procedure. ZES is a condition in which all energy in a piece of equipment is neutralized to provide maximum protection against unexpected energy release. Putting equipment into ZES typically involves securing all electrical power sources, lowering or blocking suspended parts, venting pneumatic or hydraulic pressure, releasing or blocking springs, and securing hazardous moving parts or machine products.
- 6.15 LOTO PROCEDURE:**
- 6.15.1** Prepare for lockout by identifying all energy sources and locating the energy isolating device (s) (electrical disconnects, valves, etc.) to which the lockout devices will be attached. For some operations, more than one energy source (electrical, mechanical, hydraulic, pneumatic, chemical, thermal, potential, kinetic, and any other form of energy) may be involved. The machine specific lockout procedure exists, which lists all energy sources and isolation points; it shall be used during this step.
- 6.15.2** Notify all affected people that a lockout procedure is going to be performed.

Secure the equipment using established shutdown procedures.



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If the equipment was shut down due to a power failure, or emergency stop procedures, or for unknown reasons, all operating controls must be placed in the off or normal shutdown position.

6.15.3 Lockout the energy isolating devices and attach identification tags.

Each authorized person must attach their own personal lock, to the switches, valves, etc. In situations where more than one authorized person might be involved in the lockout procedure, the first person to lockout the equipment shall use a Multiple Lockout Device on each isolation point. The last hole in the Multiple Lockout Device shall be reserved for an additional Multiple Lockout Device.

6.15.4 Release any and all potentially hazardous stored or residual energy from the equipment being serviced or maintained. Stored energy, even after lockout procedures, may still be present in pneumatic accumulators, capacitors, springs, burners, flywheels, hydraulic pistons, tanks and hoses, or just as gravity, among other energy-storing devices. Positive methods must be utilized to relieve, disconnect, restrain or otherwise safe-render any stored energy systems present.

6.15.5 After ensuring that no one is exposed, test the correct installation of all lockout devices and proper release of stored energies by attempting to start the equipment using the normal operating controls.

6.15.6 Bring operating controls to the neutral, off, or safe position. This step will help prevent an unexpected start-up when power is restored.

The equipment is now ready for servicing or maintenance.

If an authorized person leaves the lockout process for more than four hours, then the returning authorized employee must re-check that all isolation devices are still in place.

6.16 ACCEPTABLE LOCKOUT METHOD:

6.16.1 Electrical:

6.16.1.1 Lock and tag either the main or local electrical disconnect switch in the power circuit in the off position.

6.16.1.2 Locking start-stop or on-off switches, control buttons, control switches, or key controls, is not an acceptable means of securing equipment.

6.16.2 Piping:

6.16.2.1 When isolating manually operated valves, the valves shall be locked out, generally with a chain and lock or a clamshell type device, and tagged remote actuated valves are not an acceptable means of isolation unless:



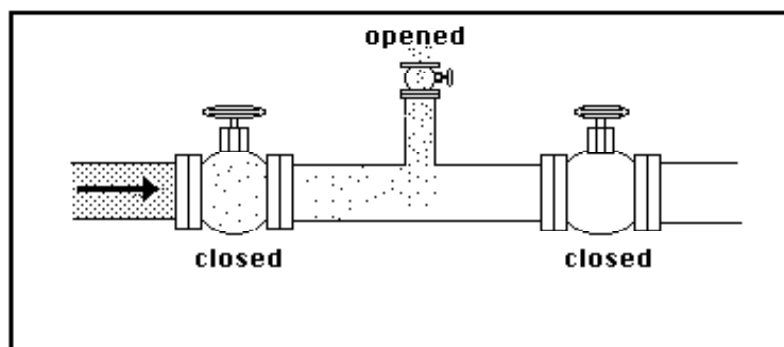
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6.16.2.2 They can be de-energized and mechanically locked closed and tagged.

6.16.2.3 A blank is installed at the nearest flange and tagged, or

6.16.2.4 Some other Positive means is used to assure protection.



6.16.2.5 A valve arrangement allowing double block and bleed, with the bleed valve open. If double block and bleed is used, the authorized person must verify that the bleed valve is not clogged or obstructed by allowing a small amount of the material to flow safely to an appropriate drain or containment.

6.16.2.6 Physical separation of the lines or blanking of lines with proper tag.

6.16.2.7 If the work is spilled over to next shift then proper handing over of the work shall be done with clear assigned role and responsibility to the next shift personnel. The work permit issued for the job shall be revalidated.

6.16.2.8 If the servicing or maintenance on a piece of equipment needs to extend beyond one shift, then all authorized people leaving the facility must remove their personal locks from the equipment at the end of the shift. To insure that the lockout process remains in-effect, an authorized person's lock(s) from the outgoing shift must remain on the equipment or lockbox until an authorized person's lock(s) from the incoming shift is attached.

6.16.2.9 All authorized people coming in to start a new shift must apply their own personal locks to the equipment or a group lockout as per situation exists.

6.17 GROUP LOCKOUT:

6.17.1 When complex pieces of equipment or processes with multiple energy sources are being worked on by a number of authorized people, the following Group Lockout Procedure may be used:



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6.17.2 The supervisor or other authorized person, can lockout the equipment for the crew by following the machine specific lockout procedure and placing a lockout device and tag on each isolation point.

6.17.3 All keys to the locks used to isolate the equipment are then placed into a group lockout device (lockbox).

6.17.4 Each authorized person working on the equipment then places a personal lock on the lockbox to secure the keys. Note: Any authorized person working under a group lockout system has the right to review that the application of the lockout devices was done in accordance with the machine specific lockout procedure.

6.17.5 When the lockout activity is completed or at the end of the shift, each authorized person shall remove his own personal lock from the group lockbox.

6.17.6 Once all personal locks have been removed, the supervisor, or other authorized person, can then remove the keys from the lockbox, unlock the equipment, assure that the area is clear, and restart the equipment.

6.18 SHIFT CHANGE:

6.18.1 If the work is spilled over to next shift then proper handing over of the work shall be done with clear assigned role and responsibility to the next shift personnel. The work permit issued for the job shall be revalidated.

6.18.2 If the servicing or maintenance on a piece of equipment needs to extend beyond one shift, then all authorized people leaving the facility must remove their personal locks from the equipment at the end of the shift. To insure that the lockout process remains in-effect, an authorized person's lock(s) from the outgoing shift must remain on the equipment or lockbox until an authorized person's lock(s) from the incoming shift is attached.

6.18.3 All authorized people coming in to start a new shift must apply their own personal locks to the equipment, using the process outlined in **Acceptable Lockout Method.**

6.18.4 If a group lockout situation exists, Group Lockout must also be followed.

6.18.5 REMOVAL OF ANOTHER PERSON'S LOCK:

6.18.5.1 Personal locks shall be individually keyed. If a master key is available, it shall be maintained by one member of management, such as the department head, and may only be used in an emergency.

6.18.5.2 When an employee has finished working on a particular system, he must remove his own personal lock.



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6.18.5.3 If a piece of equipment is ready to be started and the employee cannot be located, the supervisor is allowed to remove the employee's personal lock by taking the following steps:

6.18.5.3.1 Attempt to contact the person to have them remove their personal lock.

6.18.5.3.2 Check the area to ensure it is clear and safe.

6.18.5.3.3 Remove the personal lock.

6.18.5.3.4 Follow up the removal of the lock by completing the "Personal Lock Removal Report" and sending copies to the Department Head and Other permit authorizing agency explaining the action taken.

6.18.5.3.5 Take appropriate corrective action with the employee immediately upon his return to the facility and document the action.

6.18.5.3.6 Longer Duration Equipment Isolation:

6.18.5.3.7 If a piece of equipment needs to be locked out of service or isolated for a long period of time for reasons other than employee protection as outlined in this procedure, then a lock and Tag different from the general purpose should be applied.

6.18.5.3.8 A site lock must be clearly distinguishable from the personal locks used by authorized employees for their own protection, as outlined in this procedure.

6.19 RESTORING EQUIPMENT TO NORMAL OPERATION:

6.19.1 After the servicing or maintenance is complete, remove all tools, parts, and excess materials and reinstall all guards.

6.19.2 Check the area around the equipment to ensure that no one is exposed.

6.19.3 Notify all affected people that lockout devices are being removed. Operate the energy isolating devices to restore power to the equipment after removing the lockout devices.

6.19.4 Restart the equipment following normal operating procedures to test and determine the effectiveness of the service, maintenance, or repair conducted.

6.19.5 If the service, maintenance, or repair is successful, notify all affected personnel that the equipment may resume normal operations, but if further activity needs to be done then the entire procedure shall be repeated.

6.19.6 CONTRACTOR:

6.19.6.1 All contractors working must follow this procedure.



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6.19.6.2 It is the responsibility of the Work Supervisor to inform contractor management of this procedure during either the annual contractor meeting or pre-work safety meeting.

6.19.6.3 It is the responsibility of the Work Supervisor to verify that the contractor's employees are following the approved procedure.

6.19.6.4 Any contractor employee who violates the approved LOTO Procedure will not be allowed to continue working at the site.

6.20 TRAINING:

6.20.1 All authorized employees shall receive documented initial and annual refresher training on all aspects of the LOTO Procedure.

6.20.2 This training will include:

6.20.2.1 Instruction in the recognition of applicable hazardous energy sources, the type and magnitude of energy available in the workplace, and the methods and means necessary for energy isolation and control.

6.20.2.2 The location and use of the machine specific lockout procedures.

6.20.2.3 A demonstration of competency and a certification of proficiency.

6.20.3 All affected employees shall receive documented initial and annual refresher training on the purpose, general requirements and use of the LOTO Procedure. This must include the specific instructions that they are not to attempt to restart or reenergize any equipment that is locked out, unless they are the authorized employee who performed the lockout.

6.20.4 Machine specific retraining will be provided to both authorized and affected employees when equipment modifications change a machine specific lockout procedure or a new hazard is presented.

6.20.5 All training documentation (dates, content, trainer, signatures, etc.) will be maintained on file and be available for review.

6.21 AUDIT AND PROGRAMME REVIEW:

6.21.1 LOTO audit should be conducted for at least 25% of all LOTO applied and mentioned in the LOTO Inventory sheet.

6.21.2 The organization shall perform a documented annual evaluation of the entire LOTO Procedure.



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7.0 ANNEXURES:

Not Applicable.

ENCLOSURES: SOP Training Record

8.0 DISTRIBUTION:

- Controlled Copy No. 01 Quality Assurance
- Controlled Copy No. 02 Engineering
- Controlled Copy No. 03 Environment, Health & Safety
- Master Copy Quality Assurance

9.0 REFERENCE:

Not Applicable.

10.0 REVISION HISTORY:

CHANGE HISTORY LOG

Revision No.	Change Control No.	Details of Changes	Reason for Change	Effective Date	Updated By