

Summary

- Lockout/Tagout (LOTO) Definitions
- Lock, lockout devices, and equipment requirements
- Procedures
- Install, removal, transfer and testing - verify
- Multi-worker LOTO
- Multi-point LOTO
- Removal of locks by CSO permission
- Training
- Audits

INST6300- LLE Lockout/Tagout (LOTO) Program



- INST6300 - Lockout/Tagout (LOTO) Program has been expanded to include the entire laboratory
- Defines LOTO requirements including procedures, training, audits
- Identifies standardized locks and lockout devices that will be used
- Requirements/instructions for LOTO have been removed from LFORM
- Within the Omega Facility (60, EP, CT&F) LFORM still governs the administration of LOTO as it applies to the Facility

INST6300- LLE Lockout/Tagout (LOTO) Program



Purpose

The purpose of this instruction is to ensure the safety of personnel who could be injured by the unexpected operation of equipment or release of (hazardous) energy while servicing or maintaining equipment.

Hazardous energy – Energy sources (such as chemical, electrical, laser, potential, kinetic, and thermal) that are capable of causing injury or equipment damage.

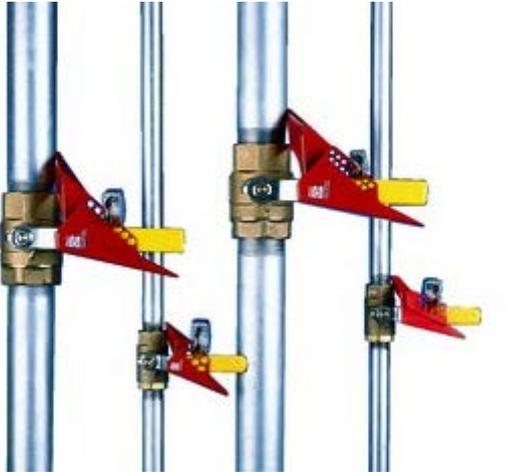
Energy Isolation Device

- Isolate the equipment from the energy source
- Isolation device
 - Circuit breaker
 - Pressure valve
 - Machine block



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Lockout Devices



Ball Valve Devices



Circuit Disconnect Devices

Worker Roles and Responsibilities



Authorized Worker - A person who locks out or tags out equipment in order to perform maintenance.

Lead Worker – An authorized worker who is initiating maintenance or repair of equipment where multiple authorized workers will be participating. This may include overseeing the implementation of a group LOTO, a multi-point LOTO, or both.

Work Area Supervisor – Is a designated individual responsible for specific work area(s)

LOTO Work Area Supervisor – Is a designated individual responsible for review of LOTO procedure, may be different from above

LOTO Work Area Supervisor



LOTO Supervisor

- Reviews procedures
 - Grants permission to install LOTO and perform work
 - After work is complete – gives permission to begin testing
- Or
- Gives permission for equipment to be restored to use

Functional area	LOTO Supervisor	Alternate LOTO Supervisor
OMEGA Facility	Shot Director	OMEGA Laser Facility Manager/Associate Laser Facility Manager
OMEGA EP Facility	Shot Director	OMEGA EP Laser Facility Manager/ Associate Laser Facility Manager
Cryo & Tritium Facility (C&TF)	C&TF Manager	Associate C&TF Manager
Optical Manufacturing (OMAN)	OMAN Group Leader	
Laser Development Laboratory and MTW OPAL	MTW Shot Director	Laser Technology Development Group Leader
Mechanical Rooms, including all building services (power, lighting, plumbing, N2, LN2, HVAC, etc.)	Building Operations and Management Facility Manager	Administrative Division Director
All areas not listed above	Chief Safety Officer	Electrical Safety Officer, Mechanical Safety Officer

LOTO Devices Must Meet the Following OSHA Criteria to Ensure That They are Effective and Not Removed Inadvertently



- Devices must be designated by color, shape, or size. (ABUS, Red, Unique Keyed Lock (shank length variations are allowed))
- Devices must be strong enough that they can't be removed inadvertently. Tagout devices must be attached with a single-use, self-locking material such as a nylon cable tie.
- Any worker who sees a LOTO device must be able to recognize who attached it and its purpose.
- Each lock must have a unique key or combination.

Only Approved Locks May be Used for Lockout

- Locks are engraved with Key serial numbers
- Installer shall maintain control of key until lock is removed
- ID Tags will accompany each lock with, at a minimum, the installers name and installation date clearly printed.



Tagout

- Only the approved red Danger Tags may be used for Tagout at LLE
- Every tag must be filled out completely.
- Within the Omega Facility, the Tag number will correspond to the appropriate Out of Commission (OOC) Log number entry, all other areas may mark the Tag No. “n/a”.



Locks will be used where feasible, otherwise use a Tagout

LOTO Procedures



- Written procedures shall be developed and utilized for the control of potentially hazardous energy when workers are engaged in maintenance activities.
- Authorized workers who lockout or tagout equipment or do maintenance must follow appropriate dedicated LOTO procedure or the specific procedures of the LOTO Form as applicable.
- Copies of LOTO Forms will be maintained in the individual work areas.
- Inactive copies will be filed in the Safety Office after an audit is completed.

LOTO Procedure Form



- LOTO Procedure Form will be used to detail and approve the specific procedures required for a particular task.
- For any foreseeable or routine task, a dedicated LOTO procedure may be published. It shall have all the elements and signatures of the LOTO Form.
- In all other instances LOTO Form will be used.

Lockout/Tagout Number: _____ Authorized Worker (coordinator): _____
 Additional Worker(s): _____

1. Describe the equipment/system to be maintained and the specific work to be accomplished (if the maintenance action is described in an approved procedure, include the reference to the procedure): _____

2. Specify the procedure (or alternatively the steps on side 2 of this sheet) for shutting down the equipment and verifying that the hazards have been de-energized. Specifying the breakers/switches/valves to be Locked/Tagged, in order, including their position. Use the table below to record the installation of locks/tags and their subsequent removal when the maintenance is completed.

Procedure ID: _____ or WAP #: _____

Tag suffix (-A, -B)	Breaker, switch, or valve identification	Position O = open/off S = shut	Lock Installed (Y/N)	Lock/Tag Installed* (Signature/Date/Time)	Hazard verified to be de-energized	Locks/Tags Removed* (Initials/Date/Time)

This section to be filled out after permission obtained, the lock(s)/tag(s) hung, and the hazard mitigation is verified

The above lockout/tagout has been reviewed and permission granted to proceed by:

 (LOTO Work Area Supervisor) / (Time and Date)

Lockout/tagout cleared by:

 (LOTO Work Area Supervisor) / (Time and Date)

*In cases where responsibility for the lockout must be transferred, the new lock(s) must be installed prior to the off going person removing his/her lock. The transfer is tracked on this form.

LOTO Procedure Form



- Fill out Section 1 & 2
- Fill out Columns 2 & 3

- Review with LOTO Supervisor – signature

- Fill out Columns 4, 5, & 6

- Perform Work

- Fill out Column 7

- Clear with LOTO Supervisor – signature

Lockout/Tagout Number: _____ Authorized Worker (coordinator): _____
 Additional Worker(s): _____

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 (LOTO Work Area Supervisor) / (Time and Date)

*In cases where responsibility for the lockout must be transferred, the new lock(s) must be installed prior to the off going person removing his/her lock. The transfer is tracked on this form.

Workers must do the following before maintenance begins



- 1) Review the maintenance or service procedure and obtain permission to proceed from the Work Area Supervisor.
- 2) Follow documented LOTO procedures.
- 3) Inform all affected workers of equipment shutdown.
- 4) Shut down equipment.
- 5) Isolate or block hazardous energy.
- 6) Lockout and/or tagout all required energy isolation devices.
- 7) Remove any potential (stored) energy, e.g. discharge capacitors, vent pressurized tanks, drain hazardous liquids, etc.
- 8) Verify the equipment is isolated from hazardous energy and de-energized.

Workers must do the following before removing lockout or tagout devices



If maintenance is complete and equipment is in a safe condition to be powered:

- 1) Re-assemble equipment and remove all tools.
- 2) Communicate intent to operate equipment
- 3) Ensure all workers are clear of the work area.
- 4) Verify equipment power controls are off or in a neutral position.
- 5) Remove LOTO
- 6) Remove the energy isolation device(s)

Removing LOTO and Testing of Equipment



When power is needed to test the equipment, temporary removal of lockout devices is allowed, as follows:

- 1) Execute steps for removing LOTO
- 2) A trained operator shall be responsible for supervising and/or conducting equipment testing.
- 3) Ensure area is clear of other workers
- 4) Proceed with testing

If further repairs are required, reinstall LOTO per section above

Workers must do the following when transferring a lockout



If maintenance is incomplete, and responsibility is being transferred to another authorized worker:

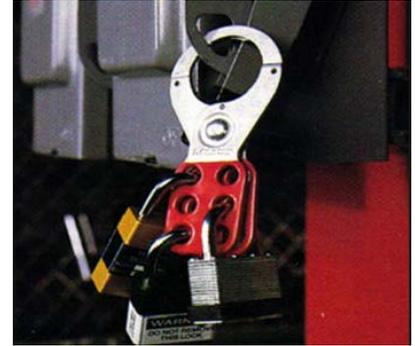
- 1) Obtain authorization from the Work Area Supervisor to transfer responsibility,
- 2) Remove all unnecessary materials and tools
- 3) New (in coming) authorized worker shall install his/her lock bearing a tag having owner's name and transfer date/time
- 4) Current (off going) authorized worker shall remove his/her lock

Keys Shall Never Be Transferred!!

Multiple workers – Group lockout

When multiple workers are involved with a task:

- One worker shall be assigned the role of Lead Worker
- The Lead Worker shall perform the LOTO install steps
- A device will be used that accepts multiple locks
- Each additional worker shall add a lock that is under his/her exclusive control and shall confirm that the equipment is isolated from hazardous energy and de-energized
- Lead Workers lock will remain on until all work is completed



Multi-point LOTO



- Multi-point LOTO is required for maintenance or repair of equipment or systems for which multiple potential hazardous energy sources or multiple LOTO locations exist.
- A Lead Worker will be designated to verify LOTO are installed in required locations

Multi-point lockout - Lead Worker's Tasks



Lead Worker will:

- Ensure that the procedure(s) is followed
- Track that each LOTO is installed (per above section)
- Verify that all required LOTO points are installed and all keys are placed in the group lock box
- The Lead Worker's lock is the first lock to be applied on the group lockbox and the lock must stay in place for the duration of all work.
- The Lead Worker's lock will be the last lock to be removed

Additional workers will add their lock to the group lockbox as work is performed

Shift changes – Transferring a LOTO



Employers must ensure the continuity of worker protection by providing for the orderly transfer of lockout or tagout device protection between off-going and incoming workers.

- Locks, never keys, will be transferred between workers at the LOTO location.
 - The oncoming worker will install his/her lock and then
 - The off-going worker will remove his/her lock.

Keys Shall Never Be Transferred!!

Removal of Lock by Someone Other Than Installer



If a lock or tag must be removed by someone other than the installing worker:

- Due diligence must be exercised in attempting to communicate with the installer to understand the state of the equipment and status of the work
- It must be reviewed and approved by the Chief Safety Officer or the appropriate Work Area Supervisor
- In the case of lock removal, the LLE Chief Safety Officer must be informed and will perform further investigation to understand the root cause

Removal of Lock by Someone Other Than Installer – Spare Keys



To obtain a spare key see:

- OMEGA Facility – Shot Director
- O & M – John Sawyer
- All Other Areas – LLE Chief Safety Officer

LLE Chief Safety Officer must be informed when a spare key is used

Long-term Shutdown of Equipment



Permanent disabling of hazardous energy sources should be done where possible:

- Disconnect electrical supplies/connectors
- Use of shorting bars on capacitors
- Removal of isolation valves or pipe sections to prevent any energy source reaching the system
- As needed, a lock with ID tag may be installed.

Provisions for Lockout Must be Included on New Equipment

- All new fabricated or purchased equipment must have a provision to accept a lock or lockout device if hazardous energy is accessible within the equipment



Training



Workers who may be exposed to hazardous energy shall be trained to ensure that they:

- Understand purpose and use of LOTO devices
- Ability to recognize hazardous energy sources (type and magnitude)
- Methods and means necessary for isolating and controlling hazardous energy
- Means to verify that the energy is controlled or de-energized to the greatest extent possible
- The prohibition against operating equipment that is locked or tagged out
- Annual refresher training to ensure their understanding of current/new policies

Audit of LOTO Program



Annual audit of all in-progress and completed LOTO forms:

- This audit will be performed by the Laser Facility Manager for the Omega Facility and by the respective Safety Officer for all other areas of LLE
- After completion of the audit all completed LOTO forms will be filed in the Safety Office
- If the auditor finds that workers are not following a procedure or that the procedure is not complete and comprehensive, the deficiencies must be corrected and workers re-trained

Review

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Implementation on
8/20/18

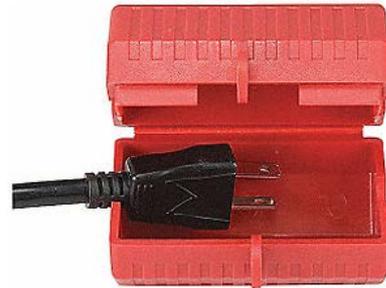
Parts Catalog – Grainger Part



Lockout Hasp
45MZ81



Wrist Coil with
Key Ring, Red
25PA31



Plug Lockout, Plastic,
110 Voltage
48KV17



Red Plastic Group Lockout Box
45KY16



Plug Lockout,
Polyethylene,
110/220/550/600 Voltage
6DGN2

Parts Catalog – Grainger Part

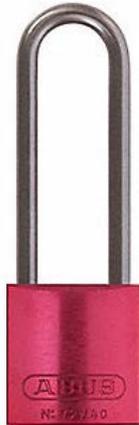
5UKR1



5UKN5



5UKK9



Padlock Station, Unfilled
3LTL4



INST6300 LOTO



Fin

INST6300 LOTO – Reference Slide



OSHA Exception: Written procedures are NOT required where **all** of the following elements exist and the Chief Safety Officer has approved:

- The equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger workers;
- The equipment has a single energy source which can be readily identified and isolated;
- The isolation and locking out of that energy source will completely de-energize and deactivate the equipment;
- The equipment is isolated from that energy source and locked out during servicing or maintenance;
- A single LOTO device will achieve a locked-out condition;
- The LOTO device is under the exclusive control of the authorized worker performing the maintenance;
- The maintenance does not create hazards for other workers;
- No unexpected activation or re-energization of the equipment has ever occurred during maintenance.