

# LLE Lockout/Tagout (LOTO) Safety Training



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**LOTO Specialist**

## Outline

- [LLE INSTRUCTION 6300](#)
- 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
- Training
- Audits
- Approved Equipment
- OSHA Exception

## **LLE INSTRUCTION 6300 - Lockout/Tagout (LOTO) Program**

### **The LLE Lockout/Tagout (LOTO) Program:**

- **Applies to 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**

## Stored Energy Can Be Hazardous

**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 can cause injury or equipment damage.**

## 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	Electrical Safety Officer/ LOTO Specialist	Chief 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



## 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 shall 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.**

# 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): \_\_\_\_\_

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): \_\_\_\_\_  
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 (LOTO Work Area Supervisor) / (Time and Date)

Lockout/tagout cleared by:  
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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.**

## Step to Follow for Removing Lockout or Tagout Devices

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

- 1) Clear work area of all tools and equipment**
- 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 lockout, tagout, and energy isolation devices**
- 6) Update the status in the logbook**
- 7) Energize equipment**

## Temporary Removal of Locks and Tags for Testing of Equipment

**When energizing equipment for testing, temporary removal of lockout devices is allowed, as follows:**

- 1) Execute steps for removing and clearing the Lockout/Tagout (Slide 16)**
- 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 Locks/Tags per section above (Slide 15)**

## Workers Must Do The Following When Transferring A Lockout

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

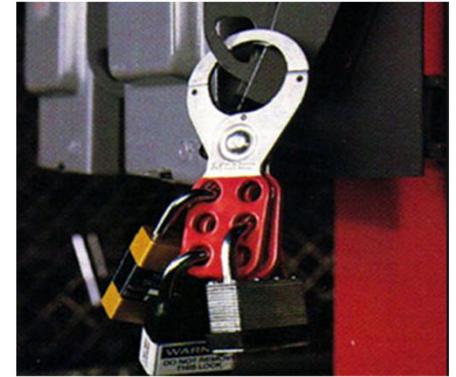
- 1) Obtain authorization from the Work Area Supervisor to transfer responsibility,**
- 2) Remove all unnecessary materials and tools**
- 3) New (in coming) authorized worker shall install their lock bearing a tag having owner's name and transfer date/time**
- 4) Current (off going) authorized worker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

## 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 their lock  
*and then*
  - The off-going worker will remove their 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**
- **Review and approval by the LOTO Specialist or Chief Safety Officer is required**
- **The safety office may choose to 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 LOTO Specialist or**
  - **LLE Chief Safety Officer**

**Spare key must be requested from LOTO Specialist**

## 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**



## Understand purpose and use of LOTO devices

**Workers who may be exposed to hazardous energy must:**

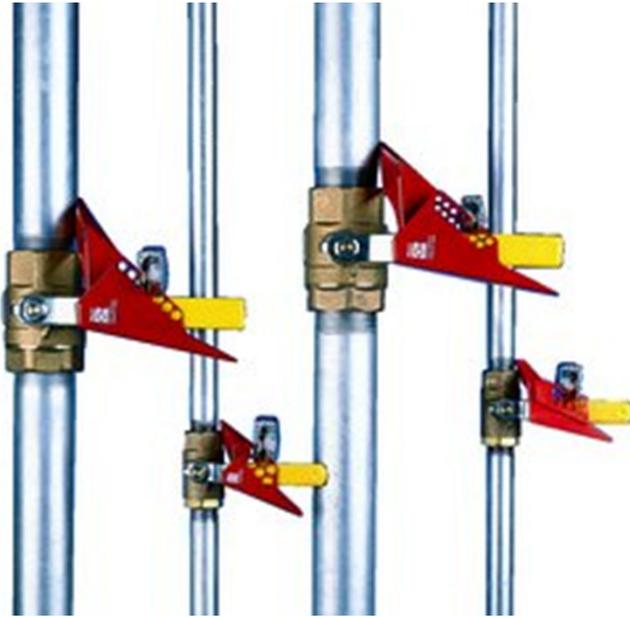
- **Be able to recognize hazardous energy sources (type and magnitude)**
- **Obtain the methods and means necessary for isolating and controlling hazardous energy**
- **Verify that the energy is controlled or de-energized to the greatest extent possible**
- **Not operate equipment that is locked or tagged out**
- **Complete the annual refresher training to ensure understanding of current/new policies**

## LOTO Program Audit

**An annual audit of all in-progress and completed LOTO forms:**

- **Will be performed by the Laser Facility Manager for the Omega Facility and by the respective Safety Officer for all other areas of LLE**
- **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**

# Lockout Devices



**Ball Valve Devices**



**Circuit Disconnect Devices**

# LLE Approved LOTO Equipment

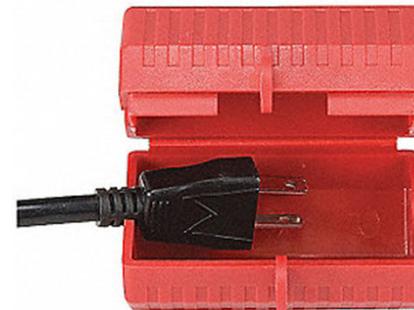
## Parts Catalog – Grainger Part #



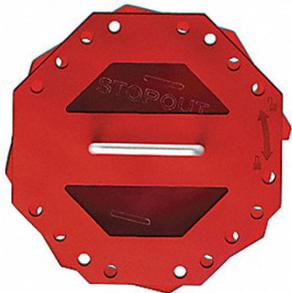
Lockout Hasp  
45MZ81



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

## LLE Approved LOTO Equipment (continued)

Parts Catalog – Grainger Part #

5UKR1



5UKN5



5UKK9



Padlock Station, Unfilled  
3LTL4



## Energy Isolating Device

### Energy Isolation Device

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



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## OSHA Exception

**Written procedures are NOT required where *all* the following elements exist and the LOTO Specialist or 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.**