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| Safety Manual Lockout / Tagout Program |
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Policy Section No.:53
Revision No.: 3

Effective: 06-99
Revision Date: 11-16
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Lockout / Tagout Program

1. Purpose and Scope

- 1.1 This is a statement of official THERMA policy to establish the process for compliance with the Occupational Safety and Health Administration (OSHA) regulation, "Control of Hazardous Energy", 29 CFR 1910.147. It is intended to protect employees from the hazards caused by the inadvertent activation of equipment or systems while work is performed on it/them. This policy establishes the minimum requirements to protect employees from such hazards.

2. Responsibility

- 2.1 It is the duty of all Foremen, Project Managers, and Supervisors to enforce this policy.
- 2.2 It is the duty of all employees to follow these procedures.
- 2.3 Enforcement of this policy shall be part of the daily safety audit.
- 2.4 It is the responsibility of the safety department manager to perform an annual review of the LOTO policy to ensure the procedures and requirement of the program are being followed. This inspection shall be documented.

3. Policy

- 3.1 Servicing, maintenance or construction which takes place during normal production operations is covered by this plan if:
 - a. An employee is required to remove or bypass a guard or safety device; or
 - b. An employee is required to place any part of his or her body into an area of the machine, piece of equipment or system where work is actually performed upon the material being processed (point of operation); or
 - c. Where an associated danger exists during a machine or system cycle
- 3.2 Minor tool changes and adjustments (e.g., clearing jammed paper from a copier, printer or typewriter) and other minor servicing activities, which are routine, repetitive, and take place during normal production operations, are not covered by this
- 3.3 This plan also does not apply to work on cord and plug connected electrical equipment for which exposure to the hazards of unexpected start-up is

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controlled by unplugging it from the energy source if the plug is under the exclusive control of the employee performing the service.

4. Application

- 4.1 The Lockout/Tagout Plan shall be implemented for all facilities where THERMA personnel work, and there is need to perform maintenance, construction or provide routine service to machinery or equipment.
- 4.2 Servicing of all electrically, chemically, pneumatically, thermally and/or hydraulically powered machinery and systems is included in this plan.
- 4.3 Contractors who perform work for THERMA shall also comply with the procedures outlined in this plan.

5. Special Circumstances

- 5.1 Job sites that present unique circumstances will require Supervisors and Foremen to develop safety plans specifically designed for that site.
- 5.2 THERMA's safety department is available to assist in the development of these plans.

6. Definitions

- 6.1 Affected personnel: Persons that may use the machine or system being serviced or worked on during the course of their work day and may attempt to activate machinery while service is being done. Affected persons also include those persons whose job requires working in an area while such servicing, maintenance or construction is being performed.
- 6.2 Authorized personnel: Persons that have received training in the use of Lockout/Tagout equipment and are authorized to perform maintenance, service or construction. Authorized personnel also include those persons responsible for properly locking and tagging machinery that is to be serviced. (Affected personnel may also be authorized personnel when that employee's duties include servicing, maintenance or construction on the machinery or system.)
- 6.3 Blank: A disk inserted into the space between two pipe flanges to prevent the passage of liquid or gases through a pipe.
- 6.4 Bleed: The release of stored hydraulic, electrical, pneumatic, or other form of energy.
- 6.5 Energy Sources: Any source of electrical, pneumatic, hydraulic, thermal, chemical, magnetic, gravitational or other type of energy.

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- 6.6 Lock: Keyed device used to secure equipment. For a lock to qualify as a Lockout device, only one key shall be available to the lock, and that lock shall stay in the possession of the affected person. Locks issued for use with this plan shall not be used for other purposes. Additionally, locks shall be able to withstand the environment in which they are being used, and a reasonable amount of force shall be required to remove the lock without the key, for example, bolt cutters, etc.
- 6.7 Lockout: A system in which a lock, when properly attached to a power or energy source, prevents the unintentional activation of equipment or systems. The lock will physically hold the switch or handle in the "off" position until it is removed by the authorized personnel. A Lockout may include a device which allows specific types of switches and valves to have a lock applied to the control system. The device may also allow multiple locks to be applied, so that more than one affected person is able to place their one-key lock to the device.
- 6.8 Lockout/ Tagout Procedures: A list of procedures, abbreviated as LOTO, designed and implemented to protect employees from an accidental discharge of energy. LOTO is used interchangeably with, "Control of Hazardous Energy".
- 6.9 Tagout: A tagging procedure, intended to act only as a warning device, used to prevent the unintentional activation of equipment. The tag will read "DO NOT OPERATE". All tags and attachment means shall also be made to withstand the environment in which they are being used, including any written instructions or information on them. Tags shall contain, at a minimum, the name of the person placing the tag, the name of the company they work for, and a contact method, such as a phone or radio number
- 6.10 Supervisor/Multiple Lockout: In most Lockout/Tagout procedures, each individual shall place their own personal lock on the energy isolating device. The supervisor (Foreman) of the crew may lock out the machine, equipment, or system using a Lock Box. Under this procedure the Supervisor takes responsibility for locking all valves, switches and controls with a one-key one-lock system, reviews the lockout with his/her crew, and places the key in a box. The other members of the crew then place their one-key, one lock system on the box, insuring that the locked out system can't be started or opened without all members of the crew removing their locks. The Supervisor shall be the only person authorized to place or remove the lockouts after the crew has removed their locks from the lock box, and the Supervisor shall ensure that all personnel are safe prior to energizing of the machine, equipment, or system. The Supervisor in charge of the lockout procedure may not leave the immediate area where the crew is working during the lockout.

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- a. **NOTE:** When a Supervisor lockout procedure is used, a member of the THERMA safety department must be notified prior to the start of the procedure.

7. Training

- 7.1 All new employees are given an orientation that includes Lockout/Tagout procedures. All employees required to service, maintain, or perform construction on machinery or systems that have the potential for release of hazardous energy shall be provided with additional training that includes review of this policy and shall take the LOTO quiz. Personnel shall be re-trained every three years in LOTO. In this additional training, employees shall be informed of:
 - a. The location and availability of the LOTO Plan.
 - b. The procedures covered by the LOTO Plan.
 - c. Explanations of provisions.
 - d. Description of physical hazards common to inappropriate locking and tagging of machinery.
 - e. Review of measures to protect employees, customers, and visitors from the inadvertent release of hazardous energy.
 - f. Discussion of procedures to de-energize equipment and release or secure all residual energies.
 - g. Evaluation technique to determine if energy hazards are present.
- 7.2 Retraining shall be provided for all authorized and affected employees every three years or whenever:
 - a. There is a change in their job assignment.
 - b. There is a change in machines, equipment or processes that present new hazards.
 - c. There is a change in the energy control procedure.
- 7.3 When Lockout/Tagout training takes place the records shall be sent to the Director of Safety and Health at the corporate office. A copy of the training, along with any applicable documents, such as a Pre-Task Plan, shall be kept in the Supervisor's records at the job site, or with the job file. The Safety Department member conducting the training shall enter the date of training the employees THERMA Training Record hand book in the appropriate section.

8. Conditions

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- 8.1 Locking devices and tags shall be used when employees are performing maintenance, service or construction on or to any machine or system where unexpected or unintentional motion/release of energy could cause harm.
- 8.2 Locking devices shall also be used when guards or other safety devices must be removed during service or when moving or energized parts put any part of the employee's body at risk of injury.
- 8.3 Examples of conditions where locking and tagging should be used may include, but are not limited to:
 - a. Clearing blocked or jammed mechanical equipment.
 - b. Maintenance or repair work on equipment with moving parts.
 - c. Confined Space entries.
 - d. Repairs or installation of electrical equipment.
 - e. Construction on pipe systems containing hazardous substances.
- 8.4 **Note:** If the equipment being serviced must be temporarily re-activated (for example, to test the equipment as part of the installation) the following sequence of actions shall be followed:
 - a. Clear the machine or equipment of tools and materials
 - b. Remove employees from the machine or equipment area
 - c. Remove the LOTO device
 - d. Energize and proceed with testing or positioning
 - e. De-energize all systems and reapply energy control measures
- 8.5 Specific instructions shall be developed using THERMA'S Pre Task Plan (PTP) for the locking and tagging of machinery, equipment or systems under the following conditions:
 - a. When the machine, equipment, or system being serviced has the potential for stored or residual energy, or the re accumulation of stored energy after shut down.
 - b. When the machine, equipment, or system has multiple energy sources.
 - c. When the isolation and locking of the machine, equipment, or system will not completely deactivate it.
 - d. When the machine, equipment, or system cannot be locked out.
 - e. When a single lockout device will not achieve a lockout condition.
 - f. When the lockout device will not be under the exclusive control of the authorized employee performing the service.

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- 8.6 If a lock cannot be applied to the equipment, and the supervisor can demonstrate that the tagging procedure will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used instead. A tag used without a lock shall be supplemented by one additional safety measure, such as:
- The removal of an isolating circuit element.
 - Blocking of a control switch.
 - Opening of an extra disconnecting device.
 - The removal of a valve handle.
 - The use of a block-off plate or "blank" inserted between flanges on a pipe system.
- 8.7 The tagout device shall be attached to the same location that the lockout device would have been attached, and shall have the name of the person that attached the tag, the estimated length of time the tagout will be in effect, and a suitable communication procedure for contacting the person that placed the tagout, such as a cell phone number.
- 8.8 In addition the THERMA Safety Department shall be contacted and informed of the procedure, including an explanation of why a lock cannot be used to render the machine, equipment or system safe.

9. General LO/TO Procedures

- 9.1 Lockout or tagout shall be performed only by authorized employee(s) who are performing the servicing or maintenance.
- 9.2 The customer representative shall be notified prior to shut down and LOTO. Notification shall contain the name and job titles of authorized employees, location of equipment being serviced, and duration/date of service.
- 9.3 Basic energy control procedures:
- "Preparation for shutdown." Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall determine where and how equipment is being energized. Since some equipment is powered by several sources e.g., electrical, mechanical, pneumatic, chemical, thermal and hydraulic), all energizing sources shall be identified. For complex equipment, refer to the manufacturer's control diagram detailing the locations of all isolating points. These points may include breaker panels, switches and valves. Furthermore, possible residual energy and methods used to dissipate or restrain that energy shall be identified. In addition to identifying energy sources, the employee must determine the magnitude of the energy, the hazards of the energy to be controlled and the methods or means to control the energy. If authorized employees are

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unable to determine each form of energy, they must consult their supervisor and/or the Safety Department before work is started.

- For complex Lockout/Tagout procedures use the attached LOTO checklist. Complete each section, entering "N/A" for those areas and sections that are not applicable.
- b. "Machine or equipment shutdown." The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment (depress the stop button, open the switch, close valve, etc.). An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.
 - c. "Machine or equipment isolation." All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).
 - d. "Lockout or tagout device application." Attach a lock and tag, of designated color, type and descriptive warning, on each disconnecting means used to de-energize circuits and equipment on which work is to be performed. The lock shall be attached to prevent persons from operating the equipment. Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use. Additionally, tags shall be attached to all points where equipment or circuits can be energized. If multiple employees are servicing the same equipment, each shall attach their own lock to a multiple lock plate.
 - If a Supervisor lockout/tagout procedure is used, the Supervisor shall ensure that all machines, equipment, and systems are locked/tagged out, that the Supervisor's key is placed in a Lock Box, and all personnel are out of danger before testing for stored energy. **Note:** No attempt shall be made to remove another employee's lock.
 - e. "Stored energy." Following the application of logout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe. If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.
 - If energy is incapable of being released, the authorized employee shall reposition, block, utilize a blank or utilize some other

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protective measure to prevent the release of residual energy while service is in progress.

- f. "Verification of isolation." Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and deenergization of the machine or equipment have been accomplished. This should be done by:
- Checking that no personnel are exposed.
 - Verifying the isolation of equipment by operating the push button or other normal operating controls.
 - Secure all switches to prevent movement to the "on" or "start" position.
 - Checking pressure gauges to ensure de-pressurization of lines.
 - Inspect electrical circuits to confirm zero voltage.
 - Open bleeder valves to verify pressure is released, while protecting against the release of hazardous materials.

10. Re-Energization Procedures

- 10.1 Authorized employees will follow these essential steps before lockout or tagout devices are removed and energy is restored to the machine or equipment:
- a. Ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.
 - b. Work area checked to ensure that all employees are safely positioned.
 - c. Remove each lockout or tagout device from the energy isolating device(s). This shall be completed by the employee who applied the device.
 - d. Notify personnel that the LO/TO devices have been removed.
- 10.2 If the authorized employee who applied the device is not available to remove it, that device may be removed by another authorized employee, with Manager approval, and the following:
- a. Verification that the authorized employee who applied the device is not at the facility:
 - b. Reasonable efforts were made to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and

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- c. The authorized employee has this knowledge before he/she resumes work at that facility.

11. Testing or Positioning of Machines, Equipment or Components

- 11.1 In situations where lockout or tagout devices must be temporarily removed to test or position the machine, equipment or component, the following sequence of actions shall be followed:
 - a. Clear the machine or equipment of tools and materials;
 - b. Remove employees from the machine or equipment;
 - c. Remove the lockout or tagout devices;
 - d. Energize and proceed with testing or positioning;
 - e. Deenergize all systems and reapply energy control measures to continue the servicing and/or maintenance.

12. Group Lockout or Tagout

- 12.1 When servicing and/or maintenance is performed by a crew, craft, department or other group, this is considered a group lockout or tagout and shall include the following specific requirements:
 - a. Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device;
 - b. The authorized employee shall review the exposure status of individual group members; Assignment of overall responsibility to an authorized employee designated to coordinate affected work forces and ensure continuity of protection;
 - c. Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

13. Shift or Personnel Changes

- 13.1 Specific procedures shall be utilized during shift or personnel changes. This ensures the continuity of protection, including provisions for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees

14. Outside Personnel

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- 14.1 Whenever outside servicing personnel are to be engaged in activities requiring LOTO, Therma and the outside employer shall inform each other of their respective lockout or tagout procedures. Therma shall ensure that his/her employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program.

15. Addendum For the Use of a Lock Box in Lockout Situations

- 15.1 The following procedure shall be followed when establishing a lock box situation. This procedure will only be implemented by a Foreman, General Foreman, Project Manager, or the designated Safety Coordinator for the job site. Whenever a lock box is used the Therma Safety Department will be notified prior to use.
- The General Foreman and Foreman are responsible to have all check off lists, hot work permits, pre-task plans or any other required paper work at the same location as the lock box while the work is performed.
 - The General Foreman and Foreman for the work area shall identify the energy sources that are to be locked out to isolate the system, and shall place a lock on each energy source that has only one key, retained by the person applying the lock. At no time shall any lock be used that has more than one key.
 - All energy sources shall be entered on the check off list as each is locked out, giving the number, location, etc.
 - The General Foreman, Foreman and crew shall verify that all sources of hazardous energy have been locked out and tagged properly. The tag(s) will indicate the company, person(s) who locked the system out, and shall have a contact phone or radio number on the tag.
 - All systems that are locked and tagged shall be verified for absence of hazardous energy. The General Foreman, Foreman, and crew shall be present while verification takes place.
 - Any member of the team working on the system shall have the duty to raise questions about the presence of hazardous energy, and shall not work on the system until all are satisfied that it is safe.
 - The General Foreman and/or Foreman shall place the key(s) used to lock the system(s) into a lock box that has multiple lock locations on it, or uses a multiple lock hasp to secure it.
 - All Personnel that will work on the system(s) shall place their key(s) on the lock box. The lock box must be locked by all members of the team in such a way that any one lock left on the box will prevent it from opening.

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- i. When the worker has finished work on the system, or at the end of the work shift, they will remove their lock from the lock box. Any person that leaves a job site while their lock is on the lock box is in violation of THERMA'S policy. If the system is to remain locked until the next work shift, the General Foreman or Foreman shall have the facility personnel put their lockout system(s) on and take possession of the procedures. When work resumes, the process of lockout, tagout, verification, and lockbox procedure shall be repeated for that shift.
 - j. If a person participating in the lock box procedure leaves the site and the system must be re-activated, only the General Foreman, Foreman, or Safety Coordinator shall notify the person that their lock has been removed. Only then shall the General Foreman, Foreman or Safety Coordinator remove that person's lock. The person leaving the site will be subject to disciplinary action, unless it is determined that circumstances that required them to leave were justified.
 - k. The General Foreman, Foreman, or Safety Coordinator controlling the lockbox shall verify that it is safe to remove the locks, and then shall allow the crew to remove their locks. Only then will the system be re-activated.
- 15.2 These procedures or their equivalent shall be used in all Supervisor controlled lock box situations.

LOCKOUT/TAGOUT CHECKLIST

Prior to beginning work on machinery, equipment, or systems requiring Lockout/Tagout, check each item. If there are items that are not applicable to the entry, mark them "N/A".

| | | |
|-----------|------------|------------|
| Job Site: | Date: | Time: |
| Foreman: | Exp. Date: | Exp. Time: |

PERSONAL PROTECTIVE EQUIPMENT

| |
|---|
| <input type="checkbox"/> Hard Hat |
| <input type="checkbox"/> Eye/Face Protection (type) |
| <input type="checkbox"/> Protective clothing (type) |
| <input type="checkbox"/> Gloves (type) |
| <input type="checkbox"/> Respirator (type) |
| <input type="checkbox"/> Fall protection / Other |

SHUTDOWN & LOCKOUT

| |
|---|
| <input type="checkbox"/> Electrical lockout/tagout completed |
| <input type="checkbox"/> Valves closed, lockout/tagout completed |
| <input type="checkbox"/> Lines blinded/blocked off |
| <input type="checkbox"/> Lines disconnected |
| <input type="checkbox"/> Line bleeders open |
| <input type="checkbox"/> All hydraulic/pneumatic pressure released |
| <input type="checkbox"/> All other energy released and/or guarded (magnetic, spring, gravity, reactivity) |
| <input type="checkbox"/> Hot work permit completed |
| <input type="checkbox"/> System/area check for flammables/vapors |
| <input type="checkbox"/> Fire extinguisher on site/in area |
| <input type="checkbox"/> Barricade/Exclusion Zone markers in place |
| <input type="checkbox"/> Machine/Equipment/System users / other personnel notified |

REACTIVATION

| |
|--|
| <input type="checkbox"/> Electrical/System reconnected |
| <input type="checkbox"/> Line blinds/block-offs removed |
| <input type="checkbox"/> Line bleeders closed |
| <input type="checkbox"/> Guards reinstalled |
| <input type="checkbox"/> Tools/materials removed |
| <input type="checkbox"/> Machine/Equipment/System users / other personnel clear and safe |
| <input type="checkbox"/> Electrical lockout/tagout removed |
| <input type="checkbox"/> Valve(s) lockout/tagout removed |

WORK TEAM

[illegible]

JOB COMPLETED

| | |
|--------------|--------------|
| Date: | Time: |
|--------------|--------------|