



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362

Asbestos Awareness Written Program

TEI PROGRAM SAFETY-001 Asbestos Awareness R05 20241224

1. Introduction

- a. To ensure safe working conditions and to comply with OSHA requirements 29 CFR 1910.1001 and 29 CFR 1926.1101, this applies to all occupational exposures to Asbestos Containing Material, (ACM) and Presumed Asbestos Containing Material, (PACM) in the workplace. This program is designed to ensure that Thompson Electric, Inc. (TEI) employees follow the appropriate procedures to prevent asbestos exposure to themselves, customers, visitors, maintenance personnel, and sub-contractors.
- b. TEI is committed to providing a safe and healthy environment for its employees, contractors, and visitors. This is a shared responsibility and every person at TEI has a role in maintaining a safe environment.
- c. No employee of Thompson Electric, Inc. shall perform any type of asbestos abatement work. All removal or disturbance of known asbestos containing materials (ACM) and presumed asbestos containing material (PACM) will be performed under controlled conditions by asbestos abatement workers appropriately trained and licensed by the applicable State agency.
- d. Materials that could potentially contain asbestos include:
 - i. Some floor tiles and mastics (glue)
 - ii. Some brake shoes and clutches
 - iii. Some pipe insulation
 - iv. Some duct work insulation
 - v. Some wall insulation/coatings
 - vi. Roofing materials
 - vii. Transite panels
 - viii. Wiring insulation
 - ix. Sprayed on fire retardant material
 - x. Plaster
 - xi. Ceiling tiles

2. Definitions

- a. In an effort to maintain consistency in the interpretation and meaning of various terms and titles, Thompson Electric has established the following definitions that will apply to this policy and the related procedures.
 - i. **Asbestos** - includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos and any of these minerals that have been chemically treated and/or altered. For purposes of this program, “asbestos” includes PACM, as defined below.
 - ii. **Asbestos-Containing Material (ACM)** - any material containing more than 1% asbestos.
 - iii. **Asbestos Abatement Contractor** – Any person, firm or corporation, who has valid licenses issued by the appropriate for the purpose of removal, enclosure or encapsulation of asbestos containing materials.
 - iv. **Building/Facility Owner** - the legal entity, including a lessee, which exercises control over management and record keeping functions relating to a building and/or facility in which activities covered by this Standard take place.
 - v. **Certified Industrial Hygienist (CIH)** - one certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.
 - vi. **Class I Asbestos Work** - means activities involving the removal of TSI and surfacing ACM and PACM.

- vii. **Class II Asbestos Work** - means activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.
- viii. **Class III Asbestos Work** - means repair and maintenance operations, where "ACM", including TSI and surfacing ACM and PACM, is likely to be disturbed.
- ix. **Class IV Asbestos Work** - means maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.
- x. **Disturbance** - activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM.
- xi. **Employee Exposure** - Exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.
- xii. **Excursion Limit** - a time-weighted average (TWA) exposure limit that is set for a short period of time, typically 15 minutes, to reduce the total exposure of employees to a substance. ELs are used when there is no short-term exposure limit (STEL) for a substance, or when excursions above the TLV-TWA need to be controlled.
- xiii. **Fiber** - a particulate form of asbestos 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1. Airborne fibers measured in fibers per cubic centimeter (f/cc).
- xiv. **High-Efficiency Particulate Air (HEPA) Filter** - means a filter capable of trapping and retaining at least 99.97 percent of 0.3 micrometer diameter mono-dispersed particles.
- xv. **Homogeneous Area** - an area of surfacing material or thermal system insulation that is uniform in color and texture.
- xvi. **Industrial Hygienist** - a professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards.
- xvii. **Negative Exposure Assessment** – air monitoring of any one specific job in which ACM or PACM are present that is used to demonstrate employee exposure will be less than PELs at all times.
- xviii. **PACM** – presumed asbestos containing material
- xix. **Permissible Exposure Limits (PELs)** – measured concentrations of chemicals or contaminants based on the average concentration of a chemical to which workers can be exposed to over an 8-hour workday, 5 days per week, for a lifetime without receiving damaging effects.
- xx. **Presumed Asbestos Containing Material** - thermal system insulation and surfacing material found in buildings constructed no later than 1980.
- xxi. **Regulated Area** - an area established by the employer to demarcate areas where airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the permissible exposure limits.
- xxii. **Surfacing ACM** - surfacing material which contains more than 1% asbestos.
- xxiii. **Surfacing Material** - material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing and other purposes).

- xxiv. ***Thermal System Insulation (TSI)*** - ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.
- xxv. ***Thermal System Insulation ACM*** - thermal system insulation which contains more than 1% asbestos.
- xxvi. ***Time Weighted Average (TWA)*** – the employee’s average airborne exposure in any 8-hour work shift of a 40-hour work week which shall not be exceeded.

3. Program Administration

a. Safety Manager:

- i. Coordinate air sampling by a CIH with division management for jobs where ACM or PACM are present to establish either a negative exposure assessment or determine the need for abatement.
- ii. Ensure that all ACM and PACM abatement be conducted only by a “Qualified” licensed asbestos abatement contractor.
- iii. Maintain all Negative Exposure Assessment data until TEI is no longer relying on such data i.e., end of job.
- iv. Maintaining copies Hazardous Waste Manifests and other relevant documentation related to asbestos abatement activities as related to TEI controlled projects.
- v. Providing hazard awareness training for all employees and selected contracted employees that may come into contact with PACM.
- vi. Ensuring copies of all training material, documentation of training, and making the written Asbestos Management & Maintenance plan readily available to all affected employees (including their approved labor representatives), OSHA and NIOSH representatives.
- vii. Maintaining any and all measurements taken to monitor employee exposure to asbestos and medical surveillance records for 30 years for employees who have been exposed to asbestos levels greater than the PELs.

b. Supervisory Personnel:

- i. Supervisors are responsible for ensuring employee attendance at annual Asbestos Awareness training.
- ii. Notifying the Safety Department of any damaged suspected asbestos-containing materials reported by employees.
- iii. Ensuring employees do not disturb ACM or PACM.

c. Employees:

- i. All Thompson Electric employees involved with activities that could result in the disturbance of ACM or PACM are responsible for taking adequate precautions to prevent damage to the material.
- ii. All employees (regardless of status) involved in activities in which they have the potential to come in contact with ACM and PACM are required to attend (at a minimum) at their initial assignment and then annual asbestos awareness training as required by OSHA.

4. Training & Recordkeeping

- a. All employees whose work may bring them into contact with (ACM) or (PACM) shall receive Asbestos Awareness Training as required by OSHA. This is awareness level training which is required at initial assignment and then annually thereafter.

- b. Training shall include, at a minimum:
 - i. Recognition of suspect ACM and PACM;
 - ii. That no Thompson Electric Employee is authorized to disturb ACM/PACM during their work activities;
 - iii. What to do if you do accidentally disturb ACM/PACM and to whom the disturbance is to be reported;
 - iv. Health effects;
 - v. Regulations and regulatory exposure limits;
 - vi. Sampling and abatement methods;
 - vii. Description of asbestos services being utilized;
 - viii. Asbestos Exposure Event Q & A (Appendix A);
 - ix. Asbestos Awareness Q & A (Appendix B);
 - x. Signage Recognition; and
 - xi. List of customers/locations known to have ACM/PACM.
- c. Recordkeeping:
 - i. Safety Department is responsible for maintaining records of all asbestos related documents for the appropriate time frame as follows:
 - 1. Records of awareness training maintained for one (1) year from previous training date;
 - a. Names or other identities of employee(s) trained;
 - b. Signature of the person receiving the training;
 - c. Date of the training;
 - d. Specific topics addressed during the training session; and
 - e. Signature of the person, or company, conducting the training.
 - 2. Records of exposure monitoring samples due to fiber release shall be maintained for thirty (30) year and must include the following;
 - a. Date of measurement;
 - b. Job information from which the exposure occurred;
 - c. Sampling and analytic methods used and evidence of their accuracy;
 - d. Number, duration, and results of samples taken;
 - e. Type of PPE worn, if any; and
 - f. Name and social security numbers of all employees exposed.
 - 3. Records of medical surveillance shall be maintained for thirty (30) years and must contain the following:
 - a. Employee's name and social security number;
 - b. Complete medical examination results;
 - c. Physician's written opinion;
 - d. Employee medical complaints related to asbestos exposure; and
 - e. Copy of information given to physician.
 - 4. Negative Exposure Assessment or exemption information shall be maintained for the duration of reliance on such objective data i.e., end of job. The record shall include at least the following:
 - a. Product/area qualifying for the exemption;
 - b. Source of objective data;
 - c. Testing protocols, results and/or analysis of sample;
 - d. Description of job being exempted and how the data supports the exemption; and

- e. Any other relevant information or data for the exemption.

5. Specific Procedures & Requirements

- a. TEI employees shall not work in regulated areas or perform Class I-IV asbestos work.
- b. In the event TEI employees are working adjacent to a regulated area on a multi-employer worksite, the TEI foreman shall ascertain the integrity and efficacy of the enclosure and/or other control methods prior to beginning work activities.
- c. In the event of an enclosure breach, all TEI employees shall be immediately removed from the potentially contaminated area until an exposure assessment can verify airborne asbestos is below the PELs. Until that time, TEI employees shall not access the site.
 - i. If the assessment is over the PELs, TEI shall notify affected employees as soon as possible. Notification shall not be later than 5 working days after receipt of assessment results.
 - 1. TEI shall recognize the PELs as determined by OSHA.
 - a. TWA: .1 f/cc
 - b. Excursion limit: 1 f/cc
 - ii. Employees exposed to levels at or above the PELs shall have access to medical evaluation. This includes entering into a medical surveillance program;
 - 1. No cost to employee; and
 - 2. At a reasonable time and place.
 - iii. See Appendix A for TEI's Asbestos Exposure Event Protocol for full plan of action.
- d. TEI will utilize a licensed asbestos abatement contractor or CIH in the event of a suspected fiber release incident.
 - i. TEI employees shall not enter the affected space until TEI Safety has reviewed air monitor reports provided by the licensed contractor and given permission to resume work activities.
 - ii. See Appendix A for TEI's Asbestos Exposure Event Protocol for full plan of action.
- e. TEI will utilize a licensed asbestos abatement contractor or CIH to evaluate PACM to determine asbestos content and or friability.
 - i. No TEI employees are qualified to determine if a substance contains asbestos or not.
- f. Respiratory protection shall be provided at no cost to employees, including voluntary respirator use. All respirator use shall comply with 29 CFR 1910.134.

6. Signs, Barricades, and Labels

- a. Thompson Electric Employees shall be trained to recognize asbestos signage, barricades and labels and to avoid asbestos areas so as not to accidentally disturb ACM or PACM.
 - i. Any employee who enters an Asbestos Warning area (properly defined and posted/barricaded) without authorization or disregards an asbestos sign or label will be subject to Thompson Electric's Discipline policy.

Appendix A – Asbestos Exposure Event Protocol

Asbestos Exposure Event Protocol

IF YOU SUSPECT OR KNOW THAT ASBESTOS IS ON THE PROJECT WHICH YOU ARE WORKING:

- Discuss this with your immediate supervisor.
- Make sure that yourself and all TEI workers have completed Asbestos Awareness Training prior to working on the job site. ASK THEM!
- Inform all workers of this potential hazard.
- If you are working around materials that appear to be asbestos, DO NOT DISTURB IT IN ANY WAY!

IN THE EVENT OF AN ASBESTOS EXPOSURE OR SUSPECTED EXPOSURE:

- Inform all workers to immediately leave the area and stay together.
- Go to an area nearby (inside the building if possible) that is safe, clean and isolated (if possible).
- Affected employees shall call a TEI Safety Representative as soon as safely possible to inform them of the exposure.
- Stay at this safe location until your Supervisor or the Safety Manager arrives.
- The Safety Representative and Supervisor should immediately discuss a plan of action.
- The Safety Representative should immediately proceed to the safe area where the workers are waiting, to inform them of the Plan of Action.
- After the Supervisor gathers all of the items needed for the plan of action, he/she should immediately go to the job site (safe area).
- The Safety Representative will explain the plan of action with all affected employees and support them as needed until the Supervisor arrives with the necessary items to complete plan of action.
- Locate the nearest restrooms. See if the facility has showers nearby.
- When the Supervisor arrives with clothing, footwear, trash bag (for clothing and shoes), soap and towels; the affected employees will need to remove their outer layer of clothing, shoes and tools, and place them in plastic bags.
- Have employees go to the nearest restroom and wash their hands and face with soap and water. In addition, have them rinse out their hair as best they can.
- If a shower exists in the facility, have the affected employees take a shower to thoroughly rinse off.
- With new clothing and footwear on, have the employees go home.
 - If no shower was available at the facility, instruct them to shower at home to more thoroughly rinse off.
- Instruct employees to call the Supervisor for further instructions or job assignment.
- The Safety Representative should remove affected clothing, shoes and tools from the job site for proper cleaning and/or disposal.
- Contact IBEW representative and inform them of this event.

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Origination	Safety Div.	Vice President		06/01/13
1	Revised & Updated PPE Section; Included Proper Sequence of Doffing PPE; Revised & Updated Exposure Incident Report	Safety Div.	Vice President	06/01/15	06/01/15
2	Included Training/Re-training and Recordkeeping Procedures; Included Signage and Barricade Information	Safety Div.	Vice President	08/01/15	08/01/15
3	Included Definitions of Asbestos Work by Class; Included Additional Training Topics; Included Appx. A & Appx. B; General Revisions	Safety Div.	Safety Director	07/15/2020	07/15/2020
4	Grammatical edits	Safety Div.	Safety Director	12/13/2021	12/12/2021
5	Reformatted and mass changes. All changes listed in Annual Update Changes document	Mike Tortorella	VP of Ops	1/9/2025	1/9/2025



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Ground-Fault Protection Program

Ground Fault Circuit Interrupter Requirements

TEI PROGRAM SAFETY-002 Ground-Fault Protection R4 202501

Introduction

1. This program establishes Thompson Electric, Inc.'s (herein referred to as TEI) safety requirements for:
 - a. Inspection of Portable GFCI's
 - b. Installing, using and maintaining GFCI circuits;
 - c. Standard operating procedures and guidelines to be used in the absence of GFCI's on any 120-volt, single phase 15 and 20-ampere receptacle outlets that are not a part of the permanent wiring system of the building.
2. All 120-volt, single-phase 15 and 20 ampere receptacle outlets on TEI work sites which are not part of the permanent wiring of the building or structure and which are in use by employees, will have approved ground-fault circuit interrupters for personnel protection.
3. Receptacles on a two-wire, single-phase portable or vehicle-mounted generator are insulated from the generator frame and all other grounded surfaces, need not be protected with ground-fault circuit interrupters.
4. The requirements in this policy apply to all TEI employees and TEI sub-contractor employees.

Responsibilities

1. **Division Management** is responsible for the implementation of the Ground-Fault Protection Program on their job sites. At a minimum these duties include:
 - a. Ensuring that all provisions of this program are followed by their assigned employees and subcontractor employees.
 - b. Conducting/documenting periodic Crew Based Safety Observations on their job sites to ensure compliance with all aspects of this program;
 - c. Ensuring that all Contractors and Sub-Contractors operating under the supervision of TEI are informed of and adhere to this policy;
 - d. Assisting TEI Safety in the annual update of the written Ground-Fault Protection Program and whenever necessary to include new or modified tasks, procedures and equipment; and,
 - e. Implementation of this program, up to and including ensuring that all training meets the requirements outlined in this policy for their division and work sites.
2. **Project Managers** are responsible for:
 - a. Designation of one or more Competent Persons per work site to implement and execute this program and its related procedures.
 - i. "Competent Person" means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them. - At most TEI work locations the Competent Person shall be the Site Foreman.
 - b. Conducting/documenting periodic Crew Based Safety Observations on their assigned job sites to ensure compliance with all aspects of this program. Any deficiencies should be noted and corrected as well as possible, including discussing the issue and corrective actions with the site foremen.
 - c. Ensuring a copy of this policy and procedure is available upon request, at all work sites.
 - d. Ensuring all TEI jobsites have a sufficient number of GFCI pigtails to meet the requirement that any equipment/tools to be plugged into a power supply that is not part of the permanent wiring of the building or structure be protected by a GFCI device.

3. **Competent Person** is responsible for:
 - a. Ensuring any tools or equipment that require being plugged into a receptacle utilize a GFCI receptacle or GFCI pigtail.
 - b. Prohibiting employees from using any equipment not meeting the requirements of this program.
 - c. Ensure GFCIs are used for all 120-volt, single phase, 15A-20A power connections that do not utilize the permanent wiring of the building or structure.
 - d. Ensuring employees do not use equipment that fails to meet the requirements of this program.
 - e. Ensuring that necessary, approved equipment is readily available to all affected employees.
4. **All Employees** are responsible for:
 - a. Complying, at a minimum, with the procedures and work practices outlined in TEI's Ground-Fault Protection program.
 - b. Performing a visual inspection of cord sets; cap, plug and receptacle of cord sets; equipment connected by cord and plug prior to each day's use.
 - i. Exceptions; Receptacles and cord sets that are fixed and not exposed to damage
5. **Sub-Contractors** are responsible for:
 - a. Complying, at a minimum, with the procedures and work practices outlined in Thompson Electric's Ground-Fault Protection Program
6. **Safety Department** is responsible for:
 - a. Maintaining documentation of related training.
 - b. Making the written Ground-Fault Protection Program available to employees, OSHA, and customer representatives.
 - c. Maintaining, administering, and revising this written program as needed.

Employee Training & Testing

1. Training will be provided to ensure that the purpose and procedures of the Ground-Fault Protection Program are understood by employees and that the knowledge and skill required for the safe application, usage and removal of GFCIs are conveyed to TEI employees. Training will include, but not be limited to:
 - a. The proper use and installation of Ground-Fault Circuit Interrupters
 - b. When and where a GFCI is to be installed
 - c. Daily & Periodic Inspection Procedures
 - d. Proper tagging out and/or disposal of damaged items
 - e. Questions and Answers

General Requirements

1. Employees who are exposed to electrical hazards at a work location through the use of a tool or piece of equipment that utilizes a cord set and electrical receptacle shall use ground fault circuit interrupters to protect them from these hazards. These requirements are in addition to any other specific requirements for equipment grounding conductors.
2. TEI has established and implemented this ground-fault protection program at all work locations covering all cord sets, receptacles that are not part of a building or structure and equipment connected by cord and plug that are available for use, or are in use by employees.
3. The written program will be available at each work location for review and copying via the Safety Evolution app.

4. Each GFCI pigtail, cord set, attachment cap, plug and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, will be visually inspected before each day's use for external defects, such as deformed or missing pins, improper strain relief, or insulation damage, and for indications of possible internal damage. GFCI pigtails will be tested using the inline GFCI testing module.
 - a. Equipment found damaged or defective will be removed from service immediately and tagged until inspected and repaired or replaced by the site Competent Person.
 - b. Damaged items will be tagged "DO NOT USE", removed from service, and turned over to the site Competent Person or Site Supervisory Personnel to be repaired and tested or removed from inventory and destroyed to prevent accidental usage.
5. The Site Supervisor is responsible for implementing and monitoring proper GFCI inspection and use.
6. The GFCI is not a replacement for visually checking all cords, wires, and other electrical devices for defects on a pre-use basis.
7. All 120-volt cord sets (extension cords) will have an equipment grounding conductor which will be connected to the grounding contacts of the connectors on each end of the cord. Extension cord sets used with portable electric tools and appliances will be of the three-wire type and will be designed for heavy or extra heavy-duty usage. Flexible cords used with temporary and portable lights will be designed for heavy or extra heavy-duty usage.
 - a. All temporary lights / temporary lighting circuits will be protected by a GFCI device.

Portable Generators

1. Under the following conditions, the frame of a portable generator need not be grounded and shall be permitted to serve as the grounding electrode for a system supplied by the generator:
 - a. The generator supplies only equipment mounted on the generator or cord-and plug-connected equipment through receptacles mounted on the generator, or both;
 - b. The noncurrent-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame.
 - c. A GFCI must be used on all cord/plug-in generator equipment.
2. Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated at not more than 5kW (kilowatts), where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with ground fault circuit interrupters (GFCI).
3. The original equipment manufacturers (OEM) guidelines should always be consulted for specific information and guidelines on this topic.

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	• Origination	Safety Div.	Vice President		08/01/12
01	• Replaced Safety Manager with Safety Director	Safety Div.	Vice President	12/28/12	01/31/13
02	• Revised Introduction • Removed Vice President & integrated duties into those of Division & Project Managers • Replaced President with Vice President of Operations • Updated Responsibilities				
03	• Removed Training Sign-In sheet	TEI Management	Safety Department	11/2021	12/2021
04	• Complete rework of program to eliminate the assured grounding program and move to exclusively using GFCIs • For all changes see 2025 Annual Update Document	Mike Tortorella, ASP, CEST	Safety Department	03/2025	03/2025



Thompson Electric, Inc.

Benzene

2016

Introduction

The purpose of this safety policy and procedure(s) is to establish a program to protect employees from the hazards associated with benzene and maintain benzene exposures below regulatory limits.

Benzene (CAS 71-43-2) at room temperature is a clear, colorless-to-light yellow liquid that is highly flammable. Because it is volatile, it can spread to a distant source of ignition. Benzene has a sweet aromatic odor. It is only slightly soluble in water but readily soluble with most organic solvents. Benzene is less dense than water and will float on the surface of water.

Benzene is the 17th most abundantly produced chemical in the United States. It is obtained primarily from crude petroleum. Benzene is used mainly as a raw material for synthesizing chemicals such as styrene, phenol, and cyclohexane and for manufacturing dyes, detergents, explosives, rubber, plastics, and pharmaceuticals. It is found in trace amounts in cigarette smoke and drinking water, as a contaminant in some industrial solvents, and as a constituent of motor fuels, unleaded gasoline in particular.

Benzene overexposure adversely affects numerous body systems and causes forms of health impairment and disease.

This safety policy and procedure provides guidelines to protect Thompson Electric Inc. (herein referred to as TEI) employees from the immediate and long-term effects of Benzene. It includes requirements for training, exposure assessment, and methods of compliance. Requirements are presented for Personal Protective Equipment (PPE), housekeeping, and hygiene facilities. It also presents provisions for medical surveillance, medical protection, signs, recordkeeping and observation and monitoring.

TEI employees have potential for exposure to benzene in situations where they may come in contact with gasoline products during pipeline repair and maintenance operations. Potential locations where foreseeable exposure may occur are:

- Gasoline and petroleum pipelines.
- Pipeline valve assemblies.
- Tank repair, maintenance and cleaning operations at plant and pipeline facilities.
- Refinery operations.
- Marine, rail, bulk terminals and service station operations.

This document also details areas of responsibility for the Vice President, Project Managers, Supervisors, Qualified Persons, and Employees.

These safety policies and procedures have been established in accordance with Occupational Safety and Health Administration (OSHA) standards for General Industry 29 CFR 1910.1028.

Policy

Because it is the policy of TEI to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public, employee, subcontractors, and supplemental labor employees will not...

- ***Perform any Benzene related job activity without the proper training and proper Personal Protective Equipment (PPE).***
- ***Perform emergency response cleanup where concentrations of Benzene have the potential to be above the PEL (Permissible Exposure Limit) of 1 ppm (part per million).***

Should employees be assigned such duties specialized training will be provided.

Where Benzene hazards exist that cannot be eliminated, then additional engineering practices, administrative practices, safe work practices, Personal Protective Equipment (PPE), and proper training regarding Benzene will be implemented. These measures will be implemented to minimize those hazards to ensure the safety of employees *and the public*.

It is the responsibility of each Manager, Supervisor and Employee (regardless of status) to ensure implementation of Tel's safety policy and procedure on Benzene safety. It is also the responsibility of each TEI employee to report immediately any unsafe act or condition to his or her immediate Supervisor.

Specific Responsibilities

The Vice President is responsible for:

- ❑ Ensuring that ANSI approved PPE and supplies are available to protect employees from Benzene exposure at ***no cost to the employee***. Also, they will obtain and coordinate the required training for Affected Employees. They will designate competent persons for those work activities affected by this safety policy and procedure. The Vice President will also ensure compliance with this safety policy and procedure through the auditing process (as outlined in TEI written Disciplinary Program/Safety Policy Statement).
- ❑ Development and completion of an exposure monitoring program in accordance with this policy to identify work sites where benzene levels exceed established occupational exposure limits.
- ❑ Development and implementation of a written program that shall include, at a minimum, a schedule for development and implementation of the engineering and work practice controls. These plans shall be reviewed and revised as appropriate based on the most recent exposure monitoring data, to reflect the current status of the program or to meet host employer requirements, whichever is more stringent.
- ❑ Performing periodic sampling, as required by OSHA, where benzene levels exceed the action level or PEL until monitoring justifies otherwise.
 - Host employers have the responsibility to inform TEI' personnel of any benzene exposures at a job site or facility prior to work commencing.
 - Site-specific planning for benzene exposures will be coordinated with host employer safety procedures, planning and protocols. TEI employees performing work will be notified and informed about host employer benzene safety and health procedures.
- ❑ Communicating and enforcing the requirements of this policy and its procedures to all Affected sub-contractor employees.

The Safety Director is responsible for:

- ❑ Providing consultative and audit assistance to ensure effective implementation of this safety policy and procedure.
- ❑ Providing training to all Affected Employees on this policy and related procedures.
 - ❑ Affected employees when applicable, will be trained in the host facility's potential exposure to Benzene and aware of the host employer's additional plant safety rules.
 - ❑ Affected employees when applicable, will be trained in the client's contingency plans and provisions for emergency responses to Benzene spills, fire, emergency response, etc.
- ❑ Properly marking and labeling benzene regulated areas.
- ❑ Properly labeling all containers which may contain benzene or benzene containing products.
- ❑ Administration and enforcement of the provisions and guidelines outlined in this policy.
- ❑ Implementing/enforcing work practice controls to minimize occupational exposure to benzene.
- ❑ Implementing the engineering and work practice controls to minimize occupational exposure to benzene.

- ❑ Providing ANSI/NIOSH approved Personal Protective Equipment (i.e., gloves, sleeves, aprons, chemical resistant suits, eye protection, face shields) and Respiratory Protection Equipment to all affected employees at no cost to the employee.
- ❑ The Safety Director may delegate the responsibility of various aspects of the Benzene Safety Program to a Qualified Organization (as approved by the Vice President). However, the Vice President's ultimate responsibility for his/her aspects of the program cannot be delegated.

The Human Resources Representative is responsible for:

- ❑ Ensuring that post-shift medical testing (i.e., urine phenol) is performed for employees who are exposed to benzene.
- ❑ Providing supervisors and employees with written notification of monitoring results, informing employees of those results and maintaining accurate records of exposure measurement.
- ❑ Retention and, if applicable, distribution, of all medical records for the specific time periods outlined in this plan.
- ❑ TEI will prepare and maintain an Employee Education and Training Record (*see Appendix E*) upon completion of training and any retraining.
- ❑ Making the written Benzene Safety Plan and any applicable PSM Plans/Documents available to employees, OSHA & NIOSH representatives
- ❑ The original document will be kept with the employee's records at TEI main office and a copy of this training record will be kept in the "Safety File" at the work site, as appropriate.

Supervisory Personnel of All Levels

- ❑ Ensuring compliance with rules regarding benzene regulated areas as set forth in this policy.
- ❑ Ensuring employees properly don, doff, store, dispose of all assigned ANSI/NIOSH approved Personal Protective Equipment and Respirators.
- ❑ Reporting any and all accidental exposures to Benzene to the Human Resources Representative immediately upon notification by the Affected employee.
- ❑ He/She will also assist "Competent" and "Qualified" persons as requested in the performance of their duties.
- ❑ With the approval of the Vice President, the Supervisor may delegate the responsibility of various aspects of the Benzene Safety Program to a Qualified Organization. However, the Supervisor's ultimate responsibility for his/her aspects of the program cannot be delegated

Competent Person

- ❑ Competent Person(s) will be responsible for identifying existing and potential Benzene hazards in the workplace. They will also be responsible for, and have complete authority to, take prompt corrective measures to eliminate or control Benzene hazards.
- ❑ The designated Competent Person must be able to:
 - Determine, prior to beginning a job, whether Benzene is present in the workplace.
 - Establish regulated areas and ensure that access to and from those areas is limited to "authorized" employees.
 - Ensure the adequacy of any employee exposure-monitoring required by the standard.
 - Ensure that all employees exposed to airborne Benzene levels above the PEL wear the appropriate PPE (personal protective equipment) and are trained to use appropriate methods to control Benzene exposure.
 - Ensure proper hygiene facilities are provided and that workers are trained to use these facilities.
 - Ensure that fire fighting equipment (i.e., fire extinguisher) of sufficient capacity is readily available in all areas where benzene is present/used/stored

- Ensure that required engineering controls are implemented, maintained in proper operating condition, and function properly.

Qualified Person

- ❑ Qualified Person(s) shall be responsible for conducting Benzene exposure assessments in accordance with this safety policy and procedure and established exposure assessment protocols.
- ❑ With the approval of the Vice President, the Qualified Person may delegate the responsibility of various aspects of the Benzene Safety Program to a Qualified Organization. However, the Qualified Person's ultimate responsibility for his/her aspects of the program cannot be delegated.

Employees

- ❑ Complying with all applicable guidelines contained in this safety policy and procedure.
- ❑ Report any unsafe act associated with this safety policy and procedure to their immediate supervisor.
- ❑ Employees who are assigned PPE are to keep them available and in good working order at all times and to have them replaced when they become worn or unsafe.
- ❑ Participating in exposure monitoring as required by OSHA regulation as well as company and customer policy.

General Personnel

- ❑ Personnel employed by TEI, and all contractors and subcontractors working at any and all construction sites operated by TEI, are required to comply with the procedures and work practices outlined in this Benzene Safety Plan.
- ❑ The Vice President is responsible for ensuring that said individuals/organizations, operating under the supervision of the TEI, are informed of and adhere to TEI Benzene Safety Program and its requirements.

Training for Outside Personnel

- ❑ Outside personnel will be trained as a TEI Authorized Employee or will be provided with a TEI Authorized Employee escort to assist in the correct procedures of the outside service personnel's Benzene Safety Plan.

Terms & Definitions

This section provides applicable definitions, establishes general provisions and identifies responsibilities required by TEI' safety policy and procedure on "Benzene in the Work Place".

ACGIH – American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

Authorized Person – Any person authorized, by TEI, and required by work duties to be present in regulated areas.

Carcinogen – A substance that causes cancer.

CAS Number – Number assigned by the Chemical Abstracts Service to identify a specific chemical.

Combustible Substance – A solid, liquid, or gas that will burn.

Corrosive Substance – A gas, liquid, or solid that causes irreversible damage to human tissue or containers.

Competent Person - A Person designated by the employer to act on the employer's behalf that is capable of identifying existing and potential Benzene hazards in the workplace and the proper methods to control them in order to protect workers, and has the authority necessary to take prompt corrective measures to eliminate or control such hazards.

DOT – Department of Transportation. Federal agency that regulates the transportation of chemicals.

EPA – Environmental Protection Agency. Federal agency responsible for regulating environmental hazards.

Fetus – An unborn human or animal.

Flammable Substance – A solid, liquid, vapor, or gas that will ignite easily and burn rapidly.

Flash Point – The temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HEPA – High-Efficiency Particulate Air Filter: A filter capable of trapping and retaining at least 99.97 % of mono-dispersed particles of 0.3 micrometers in diameter.

HHAG – Human Health Assessment Group of the federal EPA.

IARC – International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

Miscible Substance – A liquid or gas that will evenly dissolve in another.

Mg/m³ – Milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA – The Mine Safety and Health Administration. The federal agency that regulates mining. It also evaluates and approves respirators.

Mutagen – A substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG – The North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI – National Cancer Institute. A federal agency that determines the cancer-causing potential of chemicals.

NFPA – National Fire Protection Agency. Classifies substances according to their fire and explosion hazard.

NIOSH – National Institute for Occupational Safety and Health. Tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP – National Toxicology Program. Tests chemicals and reviews evidence for cancer.

OSHA – Occupational Safety and Health Administration. Adopts and enforces health and safety standards.

PIH – A DOT designation for chemicals which are Poison Inhalation Hazards.

ppm – Parts of a substance per million parts of air. It is a measure of concentration by volume in air.

Qualified Person – Person who has training and experience in air monitoring, exposure assessment, and workplace evaluations.

Reactive Substance – A solid, liquid or gas that releases energy under certain conditions.

Regulated Area – An area clearly marked and posted, where an employee's exposure to airborne concentrations of Benzene exceeds, or can reasonably be expected to exceed the permissible exposure limit (PEL).

Teratogen – Substance that causes birth defects by damaging the fetus.

TLV – Threshold Limit Value. Workplace exposure limit recommended by ACGIH.

Vapor Pressure – A measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Health Hazards/Effects

Benzene can affect the body through inhalation, skin/eye contact or accidental ingestion. Benzene has a pleasant, sweet odor, but the odor does not provide adequate warning of its health hazards.

Repeated or prolonged exposure to benzene, even at relatively low concentrations, may result in various blood disorders, ranging from anemia to leukemia. Benzene has been shown to cause cancer in humans. Benzene exposure has been associated with cancers such as myeloid leukemia, Hodgkin's disease and lymphomas. Many blood disorders associated with benzene exposure may occur without symptoms.

- **Inhalation** – Exposure to high concentrations of benzene may cause breathlessness, irritability, euphoria, or giddiness. It may cause irritation of the eyes, nose and respiratory tract. It may also cause headache, dizziness, nausea or intoxication. Severe exposures can lead to convulsions and loss of consciousness.
- **Skin Absorption/Eye Contact** – Contact with benzene may cause irritation of the skin and eyes. Benzene can be absorbed into the skin and cause dermatitis. Eye contact may result in temporary corneal damage.
- **Ingestion** – Benzene ingestion may cause nausea, vomiting, headache, dizziness and gastrointestinal irritation.

1.1 Acute Exposure – The following acute (short-term) health effects may occur immediately or shortly after exposure to Benzene:

- Benzene can irritate the eyes and skin.
- Exposure can irritate the throat.
- Benzene can cause symptoms of dizziness, lightheadedness, headache and vomiting. Convulsions and coma, or sudden death from irregular heart beat, may follow high exposure.

1.2 Chronic Exposure – The following chronic (long-term) health effects can occur at some time after exposure to Benzene and can last for months or years.

- **Cancer Hazard:** Benzene is a **carcinogen** in humans. It has been shown to cause leukemia.
- **Reproductive Hazard:** There is limited evidence that Benzene is a teratogen in animals. Until further testing has been done, it should be treated as a teratogen in humans.
- **Other Long-Term Effects:**
 - Benzene can cause drying and scaling of the skin.
 - Repeated exposure can cause damage to the blood cells [(aplastic anemia – a decrease in red blood cells, white blood cells, and platelets in the blood (pancytopenia))].

1.3 A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to Benzene.

Workplace Exposure Limits

OSHA has issued the following guidelines for employee exposures to reduce the potential for adverse health effects:

2.1 Action Level (AL):

- A concentration of benzene in the air of 0.5 parts per million (ppm) calculated as an 8-hour time weighted average (TWA).

2.2 Permissible Exposure Limit (PEL):

- A concentration of benzene in the air of 1.0 parts per million (ppm) calculated as an 8-hour time weighted average.

2.3 Short Term Exposure Limit (STEL):

- A concentration of benzene in the air of 5.0 parts per million (ppm) calculated as an average over a minimum 15-minute time period.

2.4 Benzene is a **carcinogen** in humans. There may be **no** safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

2.5 The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

Training

All Benzene Worker Training will be obtained at an accredited provider.

All levels of employees with potential job-related Benzene exposure and Competent Persons must be trained in:

- ☐ Health effects and Benzene hazards.
- ☐ Sources of Benzene exposure.
- ☐ Employee protection.
- ☐ Benzene spill response & disposal.
- ☐ Acceptable work practices to reduce Benzene exposure.
- ☐ Medical surveillance.
- ☐ Employee rights under this safety policy and procedure and the OSHA Standard on Benzene in Construction.

Employees and Competent Persons will be trained prior to their initial job or reassignment. Additionally, refresher training shall be provided annually.

Competent Persons shall receive training to conduct exposure assessments. This training shall include, as a minimum:

- ☐ Air sample flow calibration.
- ☐ Sample train set-ups.
- ☐ Analytical procedures.
- ☐ Air monitoring protocols.
- ☐ OSHA reference methods.
- ☐ Exposure calculations.
- ☐ Exposure data statistical analysis.

Competent Persons shall receive training upon initial assignment. Subsequent training shall be at the discretion of the Vice President. Refresher training shall be provided annually.

Exposure Assessment/Monitoring

4.1 Exposure Determination and Limits:

- 4.1.1** Prior to any TEI employee's entry into a potentially Benzene contaminated work area the host-facility operator will have conducted tests to determine the actual presence of benzene, or identified a potential area where Benzene could be reasonably expected to be encountered. This area shall be demarcated by the use of specific-worded signs.
- 4.1.2** The Vice President is responsible for informing employees of potential benzene exposures.
- 4.1.3** A positive test is one, which exceeds the airborne concentration action level of .5 ppm, or the PEL (permissible exposure limit), which could be either the 8-hour TWA of 1 ppm or the STEL (short-term exposure limit) of 5 ppm for 15 minutes.

4.2 Determination of Employee Exposure

- 4.2.1** Shall be made from breathing zone air samples that are representative of each employee's average exposure to airborne benzene.
- 4.2.2** Representative 8-hour TWA employee exposures shall be determined on the basis of one sample or samples representing the full shift exposure for each job classification (i.e., trade) in each work area.

4.3 Determination of Compliance

- 4.3.1** Determination of compliance with the STEL shall be made from 15 minute employee breathing zone samples measured at operations where there is reason to believe exposures are high, such as where tanks are opened, filled, unloaded, or gauged; where containers or process equipment are opened and where benzene is used for cleaning or as a solvent in an uncontrolled situation.
- 4.3.2** TEI Competent Person, along with management, may then use objective data, such as measurements from brief period measuring devices to determine where STEL monitoring is needed.
- 4.3.3** Except for initial monitoring as required, where the employer can document that one shift will consistently have higher employee exposures for an operation, TEI shall only be required to determine representative employee exposure for that operation during the shift on which the highest exposure is expected.

4.4 Initial Monitoring

- 4.4.1** Initial monitoring shall be conducted at each covered work site or operation to determine accurately the airborne concentrations of benzene to which employees may be exposed.
- 4.4.2** Where the host-facility operator has monitored, and the monitoring satisfies all other requirements, TEI may rely on such earlier monitoring results.

4.5 Periodic Monitoring & Monitoring Frequency

- 4.5.1** Periodic monitoring requirements must be met if monitoring reveals employee exposure at or above the action level but at or below the TWA. This shall be repeated at a minimum annually.
- 4.5.2** If the monitoring reveals employee exposure at or above the TWA, the monitoring shall be repeated for each Affected employee every (6) six months.
- 4.5.3** TEI reserves the right to alter the monitoring schedule from every (6) six months to annually for any Affected employee for whom (2) two consecutive measurements taken at least 7 days apart indicate that the employee exposure has decreased to the TWA or below, but is at or above the action level.
- 4.5.4** Monitoring for the STEL shall be repeated as necessary to evaluate exposure of employees subject to short-term exposures.

4.6 Termination of Monitoring

- 4.6.1** Monitoring may be terminated if the initial monitoring reveals employee exposure to be below the action level, except as otherwise required by OSHA.
- 4.6.2** If the periodic monitoring reveals that employee exposures, as indicated by at least (2) two consecutive measurements taken at least 7 days apart, are below the action level, then TEI may discontinue the monitoring for that Affected employee, except as otherwise required by OSHA or this policy.

4.7 Additional Monitoring

- 4.7.1** Additional monitoring shall be conducted when there has been a change in the production, process, control equipment, personnel, work site, or work practices which could result in new or additional exposures to benzene, or when TEI has any reason to suspect a change which may result in new or additional exposures.
- 4.7.2** Whenever spills, ruptures, or other breakdowns occur that may lead to employee exposure, TEI or the host-facility shall monitor (i.e., area or personal sampling) after the clean-up of the spill or repair of the leak, rupture or other breakdown to ensure that exposures have returned to the level that existed prior to the incident.

4.8 Employee Notification of Monitoring Results

- 4.8.1** Employees shall be notified of all monitoring results, within 15 working days after the receipt of the results of any monitoring performed, in writing, individually or by posting of results in an appropriate location that is accessible to the affected employee(s).
- 4.8.2** Whenever PEL's are exceeded, the written notification shall contain the corrective action taken to reduce the employee exposure to or below the PEL, or shall refer to a document available to the employee which states the corrective action to be taken.

4.9 Observation of Monitoring

- 4.9.1** Employees, or their designated representatives, may observe Benzene monitoring procedures at their worksite.
- 4.9.2** Employees, or their designated representatives, who observe the Benzene air monitoring are entitled to an explanation of the measurement procedure and to record the results that are obtained.
- 4.9.3** Employee, or their designated representatives, must be provided with appropriate personal protective equipment during the Benzene monitoring.

Container Labels

- 5.1** OSHA's "Right to Know" regulation requires that all chemical containers must be labeled with the name of the chemical and any of the hazards associated with that chemical. All benzene containing (>0.1%) solutions should have a warning label stating, at a minimum:



Because OSHA has designated Benzene as a carcinogen.

- 5.2** If a chemical product or chemical waste by-product containing more than 0.1% benzene is transferred into a secondary container it must be labeled at a minimum:



Because OSHA has designated benzene as a carcinogen.

- 5.3** When labeling containers of benzene with a National Fire Protection Association (NFPA) system, use the following hazard ratings:

	Health - 3
	Flammability - 3
	Reactivity - 0
	Specific Hazard (white) – i.e., oxidizer, nuclear, Acid, etc.

Exposure Controls

- 6.1** Three types of controls are used to mitigate exposure to Benzene: engineering controls, administrative controls, and personal protective equipment. Of these, engineering controls the most preferred methods are (in order of preference):
- 6.2 Engineering Controls/Administrative Controls** – Benzene work that is known to result in exposure above the PEL will typically require the following engineering and administrative controls:
- 6.2.1** Chemical fume hoods and/or local exhaust to reduce exposures to Benzene. Local exhaust shall be used to capture and exhaust benzene vapors from the worksite, thereby preventing the accumulation of high exposure levels in the affected employee's breathing zone.
 - 6.2.2** Materials containing Benzene shall not be applied by spray methods, if exposures are above the PEL, unless employees are protected with certain specified respirators (as outlined in TEI Respiratory Protection Program) and measures are taken to limit overspray and prevent contamination of adjacent areas.
 - 6.2.3** Establishment of a regulated area that will keep unprotected employees out and prevent the spread of Benzene beyond the boundaries of the area. This can include, but not be limited to; product line removal, blinding, blanking, draining, cleaning, steaming, purging, high-pressure washing, or neutralizing.
 - 6.2.4** Further, safe work procedures such as lock-out/tagout, hot-work, or confined space entry are implemented to further control exposure potentials.
 - 6.2.5** The cognizant Supervisor shall specify the necessary controls.
 - 6.2.6** When performing these tasks employees shall be provided with suitable respiratory protection (as outlined in TEI Respiratory Protection Program), protective clothing, change areas, hand-washing facilities, biological monitoring, and training at no cost to the employee.

- 6.3 Subcontract Work** – Benzene work conducted by subcontractors (other than supplemental labor) requires prior submission of a Benzene Compliance Program that incorporates all the elements specified in 29 CFR 1910.1028 and all related appendices. Contractors are also required to perform Benzene-related work in accordance with the practices and procedures as outlined in this plan. The Benzene Compliance Program shall be submitted to the Vice President and/or Project Manager for approval before beginning work that involves Benzene or the potential for Benzene exposure to any and all employees.

Respiratory Protection

Respirators must be used when the concentration of Benzene is at or above the PEL after engineering and work practice controls have not been sufficient to reduce exposures.

- 7.1** Respirators shall be selected by in conformance with OSHA requirements. Fit testing for respirators must be conducted within 6 months prior to any Benzene related work.
- 7.2** Respiratory protection shall be used if the following circumstances exist:
- 7.2.1** During the time period necessary to install or implement feasible engineering and work practice controls;
 - 7.2.2** In work operations for which assessments establishes that compliance with either the TWA or STEL through the use of engineering or work practice controls is not feasible, such as some maintenance and repair activities or vessel cleaning;
 - 7.2.3** Other operations where engineering and work practice controls are infeasible because exposures are intermittent in nature and limited in duration;
 - 7.2.4** In work situations where feasible engineering and work practice controls are not yet sufficient or are not required to reduce exposure to or below the PEL's (as outlined in section 2.0 of this policy and procedure);
 - 7.2.5** In emergency situations a positive pressure, pressure demand SCBA or a positive pressure, pressure demand, airline system with escape bottle must be worn during the initial assessments of the emergency situation until monitoring results indicate otherwise.
- 7.3** If an employee detects chemical vapor break-through of the organic vapor cartridges, the employee must immediately leave the "Regulated Area" and change the cartridges.
- 7.4** Refer to TEI Respiratory Protection Program for additional details on the basic requirement for selection, use, cleaning, and maintenance of respirators.
- 7.5** Respirators, like all PPE furnished in relationship to this safety policy and procedure, are furnished at no cost to the employee.
- 7.6** Respirator Selection Criteria:

Measured Airborne Concentration of Benzene	Respirator Type
▪ Less than or equal to 10 ppm	▪ Half face, air-purifying respirator with organic vapor cartridges.
▪ Less than or equal to 50 ppm	▪ Full face, air purifying respirator with organic vapor cartridges.
▪ Greater than 50 ppm or unknown concentration	▪ Scott SCBA or Supplied Air.
▪ Firefighting	▪ Scott 2.2 or 4.5 SCBA.
▪ Escape	▪ Any air purifying respirator with organic vapor cartridge or SCBA.

- 7.7** Any employee who cannot wear a negative pressure respirator shall be given the option of wearing a powered air-purifying respirator or supplied-air respirator.

- 7.8** When air purifying respirators are used, TEI shall replace the air-purifying element at the expiration of service life or at the beginning of each shift in which they will be used, whichever comes first. If an air-purifying element becomes available with an end of useful life indicator for Benzene (approved by MSHA/NIOSH) the element may be used until such time as the indicator shows no further useful life.
- 7.9** Employees who utilize respirators shall be allowed to leave the regulated area to wash their faces and respirator face-pieces as necessary in order to prevent skin irritation associated with respirator use or to change the filter elements of air-purifying respirators whenever they detect a change in breathing resistance or chemical vapor breakthrough.

Personal Protective Equipment

- 8.1** Appropriate protective clothing and equipment must be provided to employees who are exposed to Benzene above the PEL without regard to the use of a respirator. This clothing and equipment will be furnished at no cost to the employee.
- 8.2** PPE will be worn where appropriate to prevent eye contact and limit dermal exposure to liquids containing (or having the potential to contain) Benzene. Employees may be required to utilize one or more combinations of the following employer provided equipment, as based on the exposure or expected exposure levels, host-company guidelines, or established PPE guidelines.
- 8.3** All PPE will be inspected prior to each and every use and maintained in a safe working condition. If any defects are found or occur during use, this equipment will not be allowed for use and will be properly tagged and disposed of according to this policy.
- 8.4** ANSI/NIOSH approved PPE Includes, but is not limited to the following:
- 8.4.1** Protective Clothing. This will include chemical resistant coveralls, rain suits, aprons, chemical resistant over-shoes/boots, PVC or nitrile gloves, and other garments.
- 8.4.2** Eye protection. Eye protection must be used when there is a potential for eye contact with Benzene containing liquids. Eye/face protection available to employees are safety glasses with rigid, attached side shields, chemical goggles, and face shields.
- 8.5** Protective clothing and equipment is required to be removed in an approved and designated change area.
- 8.6** The contaminated protective clothing that is to be disposed of is to be placed in a closed labeled container in the change area.
- 8.4.1** Contaminated work clothes should never be taken home. Family members could become exposed.
- 8.7** Anyone who cleans, handles, or launders protective clothing or equipment contaminated with Benzene, must be informed of the potentially harmful effects of Benzene.

Housekeeping

- 9.1** Promptly place waste, scrap, debris, bags, containers, equipment, and clothing contaminated with Benzene, and consigned for disposal, in sealed impermeable bags (or other closed impermeable containers). Do not allow them to accumulate in the workspace.
- 9.4.1** These bags and containers must be clearly and visibly labeled as follows:



Hygiene Facilities

10.0 Hygiene facilities must be provided to ensure employee compliance with basic hygiene practices. For employees who have exposure greater than the PEL, the following are required:

10.1.1 Clean Areas for Changing Clothes. Designate change rooms where employees can segregate street clothes from clothing used for Benzene work operations that generate airborne Benzene levels exceeding the PEL.

10.1.2 Eating Areas (apart from contaminated areas). Designate separate food storage, preparation areas, and eating areas to avoid the possibility of ingesting Benzene. *No Benzene work shall be performed in these designated areas.*

- The level of Benzene in lunch areas must be below the PEL as defined in this policy.
- Before entering the lunch area, employees must remove their protective clothing and wash their face and hands.

10.1.3 Hand Washing Facilities. For all employees who perform Benzene-related tasks/operations (regardless of Benzene level), hand-washing facilities must be provided. Employees will be instructed to wash their hands and face before eating, drinking, using tobacco products, applying cosmetics or using the toilet.

10.2 Employees are prohibited from smoking, eating, and applying cosmetics in areas where the PEL is exceeded. Additionally no tobacco products, food items, or cosmetics are to be kept in work areas where employees are exposed to Benzene above the PEL.

10.3 Eye Wash Stations. Where there is any possibility that employee's eyes may be exposed to Benzene dust, an eyewash station will be provided within the immediate work area for emergency use.

Regulated Areas

11.1 Whenever it can be reasonably anticipated, that TEI employees, will be exposed to Benzene in excess of the PEL, TEI will establish a regulated area alerting employees to the hazard. This regulated area is required to be:

11.1.1 Set apart from the rest of the workplace in a way that establishes and alerts employees to the area and its hazards.

11.1.2 Is entered only by Authorized Personnel.

11.1.3 Is entered only by employees using proper Personal Protective Equipment (i.e., respirators).

11.2 All employees, upon entering a regulated area, must refrain from eating, drinking, smoking, chewing tobacco or gum, and applying cosmetics. Neither shall employees, carry, store, or use products associated with these activities in these areas.

11.2 Warning signs bearing the following information will be posted at all approaches to regulated areas:



The signs shall be well illuminated and kept clean, so that they are easily visible to employees and visitors.

Medical Surveillance Program

TEI recognizes that some employees (through the course of their assigned duties) have the potential for exposure to Benzene levels that may exceed the established permissible exposure levels. Therefore, a medical surveillance program has been established and implemented and the following guidelines are to be followed at all times.

- In the event employees are or have the potential to be exposed to Benzene at or above the action level of .5 ppm for 30 or more days per year.
- In the event employees are exposed to a PEL or greater for 10 or more days per year.
- For employees who have been exposed to more than 10 ppm of Benzene for 30 or more days in a year prior to the effective date of the standard when employed by a former employer.

12 TEI will assure that all medical examinations and procedures are performed by or under the supervision of a licensed health care professional and that all laboratory tests are conducted by an accredited laboratory.

12.1 All examinations and procedures are provided at no cost to the employee and at a reasonable time and place. Within 60 days of the effective date of this standard, or before the time of initial assignment, TEI shall provide each Affected employee with a medical examination including (at a minimum) the following elements.

A detailed occupational history which includes:

- Past work exposure to Benzene or any other hematological neoplasms;
- A family history of blood dyscrasias including hematological neoplasms
- A history of blood dyscrasias including genetic hemoglobin abnormalities, bleeding abnormalities, abnormal function of formed blood elements.
- A history of renal or liver dysfunctions;
- A history of medicinal drugs routinely taken.
- A history of previous exposure to ionizing radiation.
- Exposure to marrow toxins outside of the current work situations.
- A description of any personal protective equipment, including respirators, used or to be used by the employee, including when and for how long the employee has used that equipment.
- Relevant results of previous biological monitoring and medical examinations.

12.1 Laboratory tests. A complete blood count including a leukocyte count with differential, a quantitative thrombocyte count, hematocrit, hemoglobin, erythrocyte count and erythrocyte indices (MCV, MCH, MCHC). The results of these tests shall be reviewed by the examining physician.

12.1 Additional tests as necessary in the opinion of the examining physician, based on alterations to the components of the blood or other signs which may be related to Benzene exposure.

18..1 For all employees required to wear respirators for at least 30 days a year, the physical examination shall pay special attention to the cardiopulmonary system and shall include a pulmonary function test.

18..2 No additional medical examination is required if adequate records show that the employee has been examined in accordance with the procedures of this section within the 12 months prior to the effective date of this standard.

12.0 Medical Surveillance Program (cont.)

- 12.1 Periodic Examinations.** TEI shall provide each Affected employee with a medical examination annually following the previous examination. These periodic examinations shall include at a minimum the following elements:
- 18..1** A brief history regarding any new exposure to potential marrow toxins, changes in medicinal drug use, and the appearance of physical signs relating to blood disorders.
 - 18..2** A complete blood count including a leukocyte count with differential, quantitative thrombocyte count, hemoglobin, hematocrit, erythrocyte count and erythrocyte indices (MCV, MCH, MCHC).
 - 18..3** Appropriate additional tests as necessary, in the opinion of the examining physician, in consequence of alterations in the components of the blood or other signs which may be related to Benzene exposure.
- 12.1** Where the employee develops signs and symptoms commonly associated with toxic exposures to Benzene, TEI will provide employees with an additional medical examination which shall include those elements considered appropriate by the examining physician.
- 12.1** For persons required to use respirators for at least 30 days a year, a pulmonary function test shall be performed, at a minimum, every 3 years. A specific evaluation of the pulmonary system shall be made at the time of the pulmonary function test.
- 12.1** Emergency Examinations. These tests are in addition to the medical surveillance required. If an employee is exposed to Benzene in an emergency situation, TEI will have the employee provide a urine sample at the end of the employee's shift (to a licensed medical provider) and have a urinary phenol test performed on the sample within 72 hours. The urine specific gravity shall be cored to 1.024.
- 18..1** If the result of the urinary phenol test is below 75 mg. Phenol/L. of urine, no further testing is required.
 - 18..2** If the result of the urinary phenol test is equal to or greater than 75 mg. Phenol/L. of urine, then TEI will provide the employee with a complete blood count including an erythrocyte count, leukocyte count with differential and thrombocyte count at monthly intervals for a duration of 3 months following the emergency exposure. If any of the conditions specified exists, then the further requirements of this section shall be met, and TEI will, in addition, provide the employees with periodic examinations if directed by the physician.
- 12.1 Additional Examinations and Referrals.** Where the results of the complete blood count required for the initial and periodic examinations indicate any of the following abnormal conditions exist, then the blood count shall be repeated within 2 weeks.
- 18..1** The hemoglobin level or the hematocrit falls below the normal limit (outside the normal 95% confidence interval – C.I.) as determined by the laboratory for the particular geographic area and/or these indices show a persistent downward trend from the individual's pre-exposure norms; provided these findings cannot be explained by other medical reasons.
 - 18..2** The thrombocyte (platelet) count varies more than 20 % below the employee's most recent values or falls outside the normal limit (95% C.I.) as determined by the laboratory.
 - 18..3** The leukocyte count is below 4,000 per mm³ or there is an abnormal differential count.
 - If the abnormality persists, the examining physician shall refer the employee to a hematologist or an internist for further evaluation unless the physician has good reason to believe such referral is unnecessary.
 - 18..4** TEI will provide the hematologist or internist with the information required to be provided to the physician and the medical record required to be maintained. The hematologist or internist's evaluation shall include a determination as to the need for additional test, and TEI will assure that these tests are provided.
- 12.1** TEI will provide the following **information to the examining physician:**
- 18..1** A copy of this regulation and its appendices.
 - 18..2** A description of the Affected employee's duties as they relate to the employee's exposure.

- 18..3 The employee's actual or representative exposure level along with a description of any and all personal protective equipment used or to be used.
- 18..4 Information from previous employment-related medical examinations of the Affected employee which is not otherwise available to the examining physician.
- 12.1 **Physician's Written Opinions.** For each examination covered under this policy, TEI shall obtain and provide the employee with a copy of the examining physician's written opinion within 15 days of the examination. The written opinion shall be limited to the following information:
 - 18..1 The occupationally pertinent results of the medical examination and tests.
 - 18..2 The physician's opinion concerning whether the employee has any detected medical conditions which would place the employee's health at greater than normal risk of material impairment from exposure to Benzene.
 - 18..3 The physician's recommended limitations upon the employee's exposure to Benzene or upon the employee's use of protective clothing or equipment and respirators.
 - 18..4 A statement that the employee has been informed by the physician of any results of the medical examination and any medical conditions resulting from benzene exposure which require further explanation or treatment.
 - 18..5 The written opinion obtained by TEI will not reveal specific records, findings and diagnoses that have no bearing on the employee's ability to work in a Benzene-exposed workplace. Based on the physician's/hematologist's/internist's written opinion, an employee can be removed from Benzene exposure if the examination reveals that exposure levels may exceed the action level. A follow-up examination will be provided to the Affected employee. Return to a Benzene work0-related environment may occur based upon physician referral after a 6 month period and review of further medical testing that is conducted.
- 12.13 **Mandatory Medical Removal** – Where an employee is temporarily medically removed from a job for reasons related to Benzene exposure, TEI will remove the employee from any job where exposure is at or above the action level and provide "Medical Removal Benefits," (i.e., normal earnings, seniority, and employee rights) for a maximum of 18 months.
 - 12.13.1 If "Medical Removal" is due to the employee's inability to wear a respirator, the removal need only be from jobs with exposure to Benzene above the PEL.

13.0 Recordkeeping

- 13.1 Recordkeeping** - Three sets of records may be required based upon the severity of the exposure. These include:
- Exposure Monitoring Records;
 - Medical Surveillance Records;
 - Medical Removal Protection Records.
- 13.2 All Exposure Monitoring Records** for Benzene must be retained. These records must include:
- 13.2.1** Monitoring date and shift (i.e., time of sampling).
- 13.2.2** Details of the sampling (i.e. duration of the sampling, air volume, etc.) and analytical techniques used and evidence of their accuracy.
- 13.2.3** Type of respiratory protective device, if any, worn by the monitored employee and by any other employee whose exposure the monitoring result is intended to represent.
- 13.2.4** Results in terms of an 8 hour TWA of each sample taken, and if Benzene is not detected, the detection level utilized.
- 13.2.5** Explanation of any conditions present that might have affected the monitoring results.
- 13.2.6** The name, social security number, and job classification of all employees monitored and of all other employees whose exposures the monitoring result is intended to represent, including where applicable, a description of how it was determined that the employee's monitoring result could be taken to represent other employee's exposures.
- 13.2.7** These exposure monitoring records are to be retained for 30 years from the last date of employment.
- 13.2.8** TEI will provide a copy of the results of an employee's air monitoring to an industry trade association and to the employee's union, if any, or if either of such associations or unions do not exist, to another comparable organization that is competent to maintain such records and is reasonably accessible to employers and employees in the industry.
- 13.3 Medical Surveillance Records** – These records must also be retained and must be kept confidential. These records shall include, at a minimum:
- 13.3.1** Employee's name, social security number, and description of duties.
- 13.3.2** A copy of the physician's written opinions and of the explanation sheets for biological monitoring results.
- 13.3.3** A copy of the medical history (see Appendix A), and the results of any physical examination and all test results that are required to be provided by this policy and procedure (i.e., biological tests, X-rays, pulmonary function tests, etc.), or that have been obtained to further evaluate any condition that might be related to Benzene exposure.
- 13.3.4** Any symptomology the employee is experiencing that could be related to exposure to Benzene.
- 13.3.5** Information provided to the physician at the time of the exam (see Section 12.3 of this policy and procedure).
- 13.3.6** Copy of the result of the examination.
- 13.3.7** These medical surveillance records must be retained for the duration of employment plus 30 years in accordance with 29 CFR 1910.20.
- 13.3.8** At the employee's request, TEI will promptly provide a copy of the employee's medical record, update as appropriate, to a medical doctor or a union specified by the employee.
- 13.4 Training Records** – TEI will certify that employees have been trained by preparing a certification record for each employee trained. The training records shall be maintained on file for 1 year beyond the date of training and/or retraining.
- 13.5 Availability** – Within 15 days following a valid request, TEI will make an employee's medical records (as required to be kept by this policy and procedure) available for examination and copying to the subject employee, designated representatives, to anyone having the specific written consent of the subject employee, and after the employee's death or incapacitation, to the employee's family members.

14.0 Emergency Information

Benzene:

DOT Number UN 1114	CAS Number 103-65-1
Hazard Rating	NFPA
Flammability	3
Reactivity	0
Health	2
▪ Carcinogen ▪ Highly Flammable ➢ Special Hazards of Combustion Products: Vapor may travel considerable distance to a source of ignition and flashback ▪ Insoluble in Water	

- 12.1 Fire Fighting.** Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog. Solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. Use foam, dry chemical, or carbon dioxide. Keep run-off water out of sewers and water sources.
- 14.2 Health Hazard.** May be harmful by inhalation, ingestion, or skin absorption. May cause eye and skin irritation.
- 14.3 Reactivity Profile.** Vigorous reactions, sometimes amounting to explosions, can result from the contact between aromatic hydrocarbons, such as PROPYL BENZENE, and strong oxidizing agents. They can react exothermically with bases and with diazo compounds. Substitution at the benzene nucleus occurs by halogenation (acid catalyst), nitration, sulfonation, and the Friedel-Crafts reaction
- 14.4 Non-Fire Response.** Keep sparks, flames, and other sources of ignition away. Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Attempt to stop leak if without undue personnel hazard. Use water spray to knock-down vapors.
- 14.5 Protective Clothing.** Self-contained breathing apparatus, Chemical Resistant Suit & gloves.
- 14.6 First Aid:**
- **Eye Contact** – Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.
 - **Skin Contact** – Remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water. Seek medical attention immediately.
 - **Breathing:**
 - Remove the person from exposure.
 - Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
 - Transfer promptly to a medical facility.

Benzene Safety Program

Physical Site Location of Training:		Time of Training:	
Instructor Name (please print):		Instructor's Signature:	
		Date of Training:	
Training Roster			
Employee I.D. #	Name (Please Print)	Signature	Job Title
Summary of Training Session (Check all categories presented during training/retraining)			
	Classification of employees (authorized, affected and competent).		
	Requirements of the OSHA Standard 29 CFR 1910.128		
	Specific terms & definitions outlined in this plan.		
	Sources of Benzene exposure. Description of the operations in the work area where benzene is present.		
	Spill response & emergency procedures.		
	Acceptable work practices to reduce Benzene exposure including engineering, administrative controls, and Personal Protective Equipment required.		
	Medical surveillance program.		
	Description of the health hazards associated with exposure.		
	Instructions to report any signs and symptoms that may be attributable to benzene exposure.		
	Questions & answers.		
Please list materials passed out, media and video presented, and any pertinent lectures or materials:			



Thompson Electric, Inc.

49 Northmoreland Avenue · Munroe Falls, Ohio 44262

(330) 686-2300 F (330) 686-2362

Bloodborne Pathogens

Exposure Control Plan

TEI PROGRAM SAFETY-004 Bloodborne Pathogens R6 202501

Introduction

1. Thompson Electric (TEI) has established written program to protect employees who are identified as having the potential for occupational exposure to blood and other potentially infectious materials (OPIM). Implementation of this program is intended to comply with the OSHA Bloodborne Pathogen standard, 29 CFR 1910.1030.
2. The Exposure Control Plan (ECP) is a key document to assist our organization in implementing and ensuring compliance with the standard, thereby protecting our employees. This ECP includes:
 - a. Determination of employee exposure
 - b. Implementation of various methods of exposure control to minimize exposure, including:
 - i. Universal precautions;
 - ii. Engineering and administrative controls;
 - iii. Personal protective equipment; and
 - iv. Housekeeping.
 - c. Hepatitis B vaccination;
 - d. Post-exposure evaluation and follow-up;
 - e. Communication of hazards to employees and training;
 - f. Recordkeeping; and
 - g. Procedures for evaluating circumstances surrounding exposure incidents.

Scope

1. The requirements in this program apply to all TEI employees to ensure their safety in the event they become exposed to blood or other potentially infectious materials. The nature of TEI's work scope does not lead to anticipation of occupational exposure except as a result of an injury or accident. All TEI subcontractors are to meet these requirements as well.

Program Administration

1. TEI ***Division Managers*** are responsible for the implementation of the Exposure Control Plan as well as:
 - a. Working with the TEI Safety and Vice President of Operations to review, maintain and update the written Exposure Control Plan at least annually and whenever necessary to include new or modified tasks and procedures.
 - b. Ensuring that all Contractors and Sub-Contractors operating under the supervision of Thompson Electric are informed of and adhere to TEI's Bloodborne Pathogen Exposure Control policy specifically in regards to construction related activities.
 - c. Work with TEI Safety to ensure that all medical actions required are performed and that appropriate medical records are maintained.
2. ***Supervisory Personnel*** (i.e., Project Manager, Superintendents, General Foreman, Foreman) will be responsible for:
 - a. Providing accurate and timely information to all employees concerning exposure, identification of labels and signs, proper use of PPE, and safeguards to prevent infection.

- b. Maintain and provide all necessary personal protective equipment (PPE), engineering controls (i.e. sharp containers, etc.), labels, and red biohazard waste bags required by the standard to all employees/work sites.
 - c. Ensuring that adequate supplies of the aforementioned equipment are available in all departments.
 - d. Ensuring those employees who are reasonably anticipated to have contact with or exposure to blood or other potentially infected materials comply with the procedures and work practices outlined in this Exposure Control Plan.
- 3. **TEI Safety** is responsible for:
 - a. Ensuring that all personnel complete bloodborne pathogen training as outlined in this ECP.
 - b. Coordinating all related training, reviewing documentation of training, and making the written ECP available to employees, OSHA and NIOSH representatives.
- 4. **All Employees** are responsible for:
 - a. Identifying hazards and taking proper action to prevent infection through contact with bodily fluids or contaminated products.
 - b. Notifying a supervisor immediately when a BBP exposure condition is identified.
- 5. **All Contractors and Sub-Contractors** are responsible for:
 - a. Complying, at a minimum, with the procedures and work practices outlined in TEI's Exposure Control Plan.

Determination of Employee Exposure

- 1. TEI has evaluated the work tasks associated with the job functions of its employees to determine which tasks could be reasonably anticipated to result in exposure to bloodborne pathogens. TEI uses the following categorical distinctions to determine the level of potential exposure:
 - a. **Category I** – Tasks that involve exposure to blood, body fluids, tissues, or OPIM. All procedures or other job-related tasks that involve an inherent potential for mucous membrane or skin contact with blood, body fluids, or tissues, or a potential for spills or splashes of them.
 - i. Examples of Category I tasks are those normally associated with frequent and repetitive handling and working directly with blood products such as those performed by medical personnel (i.e., physicians, nurses, Emergency Medical Technicians, etc.). These jobs by design require an almost constant exposure to the potential for infection.
 - ii. TEI has identified no employees, contractors, sub-contractors or job tasks that require this level of potential exposure to bloodborne pathogens.
 - b. **Category II** – Tasks that involve no exposure to blood, body fluids, tissues, or OPIM, but employment may require performing unplanned Category I tasks. The normal work routine involves no exposure to blood, body fluids or tissues, but exposure may be required due to the nature of work.

- i. Category II tasks are those normally associated with employees whose primary job function does not require them, normally, to be exposed to blood or body fluids but who are trained and designated to provide First Aid and CPR (Cardiopulmonary Resuscitation) as a collateral duty to their routine job functions.
 - ii. The following is a list of job classifications in which some employees, contractors or subcontractors at our establishment or jobsites have occupational exposure. Included are a list of tasks and procedures in which occupational exposure may occur for these individuals:
 - 1. TEI First Responders – Performing First Aid, post-accident clean-up.
 - 2. Field Employees – Performing First Aid, incident/accident involvement.
 - 3. Maintenance, Mechanics, Warehouse Personnel – Post accident equipment clean-up.
 - 4. Utility/Janitorial Person - General janitorial.
 - 5. Any employee who is certified in First Aid/CPR/AED response.
- c. **Category III** – These employees and contractors do not perform tasks that involve blood, bodily fluids, tissues, or OPIM and Category I or Category II tasks are not a condition of employment.
 - i. The normal work routine does not involve contact with any form of bloodborne pathogen. Persons who perform these duties are not called upon as part of their job responsibilities to perform any Category I tasks or assist in emergency medical care or first aid.
 - 1. Personnel who fall into this category are:
 - a. Receptionists who are not First Aid/CPR certified
 - b. Administration staff who are not First Aid/CPR certified
- d. All exposure determinations, for Category I and Category II were made without regard to the use of Personal Protective Equipment.

Methods of Implementation & Control

- 1. Universal Precautions
 - a. TEI will observe all universal precautions as defined by the Center for Disease Control (CDC). Universal Precautions are designed to protect employees from exposure to all human blood and body fluids. Under universal precautions all sources of blood or body fluids are considered infectious for bloodborne pathogens, especially human immunodeficiency virus (HIV), Hepatitis B (HBV), and Hepatitis C (HCV).
 - b. Potentially infectious materials for bloodborne pathogens are:
 - i. Human blood and blood products;
 - ii. Any bodily fluid visibly contaminated with blood;
 - iii. All bodily fluids where it is difficult or impossible to differentiate between fluids;
 - iv. Any unfixed human tissue or organ; and
 - v. Semen or vaginal secretions.
 - c. Universal precautions apply to all blood, body fluids, tissues and secretions.

Engineering & Work Practice Controls

1. Engineering controls will be used to prevent or minimize exposure to Bloodborne Pathogens.
 - a. Sharps containers
 - i. Puncture-resistant disposal containers for contaminated sharps or broken glass.
 - ii. Will be inspected and maintained monthly or as necessary to prevent overfilling.
2. Administrative controls/work practices
 - a. Providing readily accessible hand washing facilities at all work locations or antiseptic solutions/towelettes.
 - b. Providing BBP Response Kits in all work vans, gang boxes, job trailers, and work areas where exposure may occur.
 - c. Washing hands immediately or as soon as feasible after removal of gloves.
 - d. Washing body parts as soon as possible after skin contact with blood or OPIM occurs.
 - e. Equipment decontamination.
 - f. Prohibiting eating, drinking, and smoking, applying cosmetics or lip balm and handling contact lenses in work areas where there is a likelihood of occupational exposure.
 - g. Prohibiting food and drink from being kept in refrigerators, freezers, shelves, cabinets or on countertops or bench tops where blood or OPIM may be present.
 - h. Requiring that all procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, splattering, and generation of droplets of these substances.
 - i. Examining equipment that may become contaminated with blood or other potentially infectious materials prior to servicing or shipping and decontaminating such equipment as necessary. Items will be labeled per the standard if not completely decontaminated.

Personal Protective Equipment (PPE)

1. All required PPE covered in this program will be provided to TEI employees at no cost to them. Training in the use of the appropriate PPE for specific tasks or procedures is provided by TEI Safety or supervisory personnel.
2. PPE shall be used if occupational exposure remains after instituting engineering and work practice controls, or if controls are not feasible.
3. PPE is located in gang boxes, job trailers, and/or foreman's vehicles and may be obtained through the Warehouse Manager, any TEI supervisor, and/or TEI Safety.
4. TEI Safety is responsible for working with the Warehouse Manager and supervisory personnel to ensure that the above described PPE is stocked, distributed, and readily available to all affected parties.
5. The following equipment must be made available at each jobsite and must be used when an incident occurs:
 - a. Disposable (single use) latex or equivalent gloves. These items shall be worn when handling contaminated items or supplying aid to an injured person(s). These items must be made part of each first aid kit.
 - i. A double layer of gloves shall be worn if incident is major and contamination covers a large area.

- b. Surgeon's mask/goggles/face shields shall be worn if splashes or splatters of potentially infectious materials are expected. These items must be made part of each first aid kit.
 - c. Antiseptic towelettes or waterless hand cleaner shall be available and used to clean their hands if hand washing is not feasible. However, team members will wash their hands in soap and warm, running water as soon as feasible.
 - d. Protective body clothing shall be worn in occupational exposure situations. The type and characteristics will depend upon the task and degree of exposure anticipated.
 - e. A disposable CPR mask shall be part of the first aid kit.
 - f. Biohazard labels shall be used to mark containers and bags containing contaminated items.
 - g. Puncture resistant containers should be made available at jobsites and at fixed facilities (at least one per location). These containers shall be used for the disposal of glass/metal contaminated material, needles (from use of bee sting kits, diabetes, EPI pens, etc.) and any other sharps.
 - h. Red biohazard bags should be on every jobsite and at every fixed facility. These items can become part of the first aid kit(s).
6. Proper Sequence of Doffing Personal Protective Clothing
- a. Soiled or stained boot covers will be removed first. Then remove outer gloves, if present.
 - b. Soiled or stained aprons or suits will be removed by rolling apparel into itself. This will keep the contaminants trapped inside and the clean part of the apparel will be on the outside.
 - c. Remove surgical mask.
 - d. Remove inner layer of gloves (or only layer of gloves). Remember to only touch the inside of the second glove by inserting bare fingers into the palm and rolling soiled glove toward fingertips.
 - e. Dispose of all PPE as biohazard waste in a red biohazard bag.

Housekeeping

1. Decontaminate any surfaces with an appropriate disinfectant immediately when overtly contaminated with blood or any OPIM.
2. Inspect and decontaminate any reusable receptacles such as bins, pails and cans that have been contaminated immediately or as soon as feasible.
3. Always use mechanical means such as tongs, forceps, or a brush and a dustpan to pick up contaminated metal shavings, broken glass, etc.; never pick up with hands even if gloves are worn.
4. Place regulated waste in closable and labeled or color-coded containers. When storing, handling, transporting or shipping, place other regulated waste in containers that are constructed to prevent leakage.
5. When discarding contaminated sharps, place them in containers that are closable, puncture-resistant, appropriately labeled or color-coded, and leak-proof on the sides and bottom.

6. Ensure that sharps containers are easily accessible to personnel and located as close as feasible to the immediate area where sharps are used or can be reasonably anticipated to be found. Sharps containers also must be kept upright throughout use, replaced routinely, closed when moved, and not allowed to overfill.
7. Never manually open, empty, or clean reusable contaminated sharps disposal containers.
8. All items that have been contaminated with blood or OPIM are to be disposed of as a regulated waste. While it is not practical or economically feasible to place specially designed waste receptacles at all TEI facilities and work sites, this does not diminish the requirement for proper labeling, handling, and disposal of bio-hazardous materials. If there is waste material generated which contains or is contaminated with blood or body fluids, the following steps shall be taken:
 - a. Do not handle (in any manner) contaminated items without the proper PPE.
 - b. Place all contaminated items in a sealable container being careful not to contaminate the outside of the container.
 - i. If the contaminated item is sharp or likely to puncture the container, use a container that is sufficiently sturdy to prevent the puncture of the container walls.
 - ii. Label the container prominently to identify that the contents are blood and/or body fluids – a biological hazard.
 - iii. Place the container in a secure area with the label completely visible.
 - iv. Dispose of gloves and other protective equipment in the same container. Ensure that glove outer surfaces do not touch the skin as they are removed.
 - v. Notify the Supervisor immediately. The Supervisor will notify TEI Safety to make the necessary arrangements to have the waste material properly contained, labeled, and disposed of.

Labeling

1. The following are universal symbols and colors used in identifying material or objects contaminated with human blood or body fluids:



2. When this symbol is identified, follow all Universal Precautions as outlined in this safety policy and procedure.
3. The above labeling method(s) will be used at our construction sites and our permanent facilities.
4. TEI Safety will ensure that red-orange biohazard labels and/or tags are affixed or appropriately labeled red bags are used as required. Employees are to notify their immediate supervisor, or in his/her absence TEI Safety if they discover unlabeled regulated waste containers.

Handwashing

1. Hands are to be washed for at least 20 seconds with non-abrasive soap before (if feasible) and after contact with contaminated surfaces and/or the administering of First Aid/CPR.
 - a. Hands are to be washed promptly upon removal of gloves and when other PPE has been used. Employees must wash hands or other skin surfaces or flush mucous membranes with water immediately or as soon as feasible following contact with blood and other body fluids.
2. Where it is not feasible to provide hand washing facilities such as on a work site, first aid kits will include an appropriate antiseptic hand cleanser or antiseptic towelettes.
3. If an occupational exposure occurs where antiseptic hand cleanser or antiseptic towelettes are used, the employee will be transported to the nearest facility with hand washing facilities and the affected area thoroughly washed with soap and running water.
4. Antimicrobial skin barriers may be used as an adjunct to hand washing and wearing gloves, but may not be used as a substitute.

Hepatitis B Vaccination

1. TEI Safety will provide information on Hepatitis B vaccinations addressing its safety, benefits, efficiency, methods of administration and availability.
2. The Hepatitis B vaccination series will be made available, at no cost, within 10 days of initial assignment, to employees who have occupational exposure to blood or other potentially infectious materials unless:
 - a. The employee has previously received the series;
 - b. Antibody testing reveals that the employee is immune;
 - c. Medical reasons prevent taking the vaccination; or
 - d. The employee chooses not to participate.
3. All employees are strongly encouraged to receive the Hepatitis B vaccination series. However, if an employee chooses to decline HBV vaccination, then the employee must sign the Declination of HBV Vaccination form.
 - a. Employees who decline may request and obtain the vaccination at a later date at no cost. Documentation of refusal of the HBV vaccination will be kept at the Main Office with the employee's other medical records.
4. Highlights of Hepatitis B Vaccination Other Requirements:
 - a. Participation in pre-screening is not a prerequisite for receiving Hepatitis B vaccination.
 - b. Vaccination administered in accordance with United States Public Health Service (USPHS) recommended protocol.
 - c. HBV vaccination booster doses must be available to employees if recommended by USPHS.

Post-Exposure Evaluation and Follow-Up

1. In the event of an exposure incident, contact your immediate supervisor or TEI Safety immediately. Each exposure must be documented by the employee on an Exposure Incident Form. The appropriate Licensed Health Care Provider will add any additional information as needed.

2. A confidential medical evaluation and follow-up will be immediately made available to the exposed employee. The evaluation shall be conducted by a Licensed Health Care Professional at the nearest Medical Care Facility. The following elements will be performed:
 - a. Document the routes of exposure and how exposure occurred.
 - b. Identification of the source individual (unless infeasible or prohibited by law.)
 - c. Obtain consent and test source individual's blood as soon as possible to determine HIV and HBV infectivity and document the source's blood test results.
 - d. If the source individual is known to be infected with either HIV or HBV, testing need not be repeated to determine the known infectivity.
 - e. Provide the exposed employee with the source individual's test results and information about applicable disclosure laws and regulation concerning the source identity and infectious status.
 - f. After obtaining consent, collect exposed employee's blood as soon as feasible after the exposure incident and test blood for HBV and HIV serological status.
 - g. If the employee does not give consent for HIV serological testing during the collection of blood for baseline testing, preserve the baseline blood sample for at least 90 days.
 - h. Post-exposure prophylaxis, when medically indicated, as recommended by the U.S. Public Health Service, shall be delivered.
 - i. Counseling services shall be made available to the exposed employee.
 - j. Evaluation of the reported illnesses.
3. An Exposure Incident Report and Post-Exposure Evaluation & Follow-Up Checklist will be provided to the employee so they may bring them along with any additional relevant medical information to the medical evaluation. Original copies of these appendixes will be maintained with employee's medical records.
4. TEI Safety will review the circumstances of the exposure incident to determine if procedures, protocols and training need to be revised.

Training & Re-Training

1. All employees who have or are reasonably anticipated to have occupational exposure to bloodborne pathogens will receive training compliant with the requirements outlined in 29 CFR 1910.1030(g)(2) at initial hiring and within one year of previous training.
2. The Division Manager, in conjunction with TEI Safety, will oversee the providing of training. The training presentation will be used to inform employees of the epidemiology, symptoms, and transmission of bloodborne diseases. In addition, the training program will cover, at a minimum, the following elements:
 - a. A copy and explanation of the OSHA bloodborne pathogen standard;
 - b. An explanation of TEI's ECP access to the ECP and how each employee may request and obtain a copy;
 - c. An explanation of methods to recognize tasks and other activities that may involve; exposure to blood and OPIM, including what constitutes an exposure incident;
 - d. An explanation of the use and limitations of engineering controls, work practices, and PPE;
 - e. An explanation of the types, uses, location, removal, handling, decontamination, and disposal of PPE;

- f. An explanation of the basis for PPE selection;
- g. Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine will be offered free of charge;
- h. Information on the appropriate actions to take and persons to contact in an emergency involving blood or OPIM;
- i. An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available;
- j. Information on the post-exposure evaluation and follow-up that TEI is required to provide for the employee following an exposure incident;
- k. An explanation of the signs and labels and/or color coding required by the standard and used at TEI; and
- l. An opportunity for interactive questions and answers with the person conducting the training session.

Recordkeeping

1. Training Records

- a. Training records are completed for each employee upon successful completion of training. These documents will be kept for at least three years at TEI's main office.
- b. The training records include:
 - i. The dates of the training sessions;
 - ii. The contents or a summary of the training sessions;
 - iii. The names and qualifications of persons conducting the training; and
 - iv. The names and job titles of all persons attending the training sessions.
- c. Employee training records are provided upon request to the employee or the employee's authorized representative within 15 working days. Such requests should be addressed to TEI Safety.

2. Medical Records

- a. Medical records are maintained for each employee with occupational exposure in accordance with 29 CFR1910.1020, "Access to Employee Exposure and Medical Records."
- b. TEI Safety is responsible for maintenance of the required medical records. These shall be confidential.
- c. Records are kept by TEI Safety at TEI's main office for at least the duration of employment plus 30 years.
- d. Employee medical records are provided upon request of the employee or to anyone having written consent of the employee within 15 working days. Such requests should be sent to TEI Safety, Thompson Electric, Inc. at 49 Northmoreland Avenue, Munroe Falls, Ohio 44262.

3. OSHA Recordkeeping

- a. An exposure incident is evaluated to determine if the case meets OSHA's Recordkeeping Requirements (29 CFR 1904). This determination and the recording activities are done by the Human Resources department.
- b. Transfer of Records

- i. If TEI ceases to do business and there is no successive employer to receive and retain the records for the prescribed period, the employer shall notify the Director of the National Institute for Occupational Safety and Health (NIOSH) at least three (3) months prior to scheduled record disposal and prepare to transmit them to the Director.
- c. Sharps Injury Log
 - i. In addition to the 1904 Recordkeeping Requirements, all percutaneous injuries from contaminated sharps are also recorded in a Sharps Injury Log. All incidences must include at least:
 - 1. Date of the injury
 - 2. Type and brand of the device involved (i.e., razor blade, needle)
 - 3. Department or work site where the incident occurred
 - 4. Explanation of how the incident occurred.
 - ii. This log is reviewed as part of the annual program evaluation and maintained for at least five years following the end of the calendar year covered. If a copy is requested by anyone, it must have any personal identifiers removed from the report.

APPENDIX A

TEI - Hepatitis B Consent/ Declination Statement Form

The following statement of declination of Hepatitis B vaccination must be signed by any employee who chooses not to accept the vaccine. The statement can only be signed by the employee who has received information regarding HBV, the Hepatitis B vaccination, the efficacy, safety, method of administration, and benefits of vaccination, and that **the vaccine and vaccination are provided free of charge to the employee**. The statement is not a waiver; employees can request and receive the Hepatitis B vaccination later if they remain occupationally at risk for HBV.

Hepatitis B is a serious liver infection caused by HBV. For some people, HBV infection becomes chronic, meaning it lasts more than six months. Most people infected with Hepatitis B as adults recover fully, even if their signs and symptoms are severe. Infants and children are more likely to develop a chronic HBV infection. A vaccine can prevent hepatitis B, but there is no cure if you have it. HBV is a very hardy virus and can survive in dried blood on a surface for up to seven days.

Hepatitis B can spread from mother to child at birth or soon after, through sexual contact, contaminated blood transfusions, needles, or exposure to HBV containing infectious materials through an open sore. Having a chronic HBV infection can lead to serious complications, such as:

- **Scarring of the liver (cirrhosis).** The inflammation associated with a HBV infection can lead to extensive liver scarring (cirrhosis), which may impair the liver's ability to function.
- **Liver cancer.** People with chronic HBV infection have an increased risk of liver cancer.
- **Liver failure.** Acute liver failure is a condition in which the vital functions of the liver shut down. When that occurs, a liver transplant is necessary to sustain life.
- **Other conditions.** People with chronic Hepatitis B may have kidney disease, inflammation of blood vessels or anemia.

Hepatitis B vaccine is an injectable vaccine that prevents HBV. In healthy people routine immunization results in more than 95% of people being protected. The Hepatitis B vaccine is a three-four shot series over a six-month period. The vaccine is given by injection into a muscle.

Additional doses may be needed in people with poor immune function but are not necessary for most people. In those who have been exposed to HBV but not immunized, HBV immune globulin should be given in addition to the vaccine. Serious side effects from the Hepatitis B vaccine are very uncommon. Pain may occur at the site of injection. It is safe for use during pregnancy or while breastfeeding.

PLEASE CHECK ONE:

_____ I have previously completed the Hepatitis B Series of vaccinations.

_____ I wish to receive the Hepatitis B vaccine.

_____ I decline to receive the Hepatitis B vaccine. Please read, sign and date the declination statement page in addition to this Hepatitis B Consent/Declination Statement.

Employee Name: _____

Employee Signature: _____ Date: _____

APPENDIX A

TEI - Hepatitis B Consent/ Declination Statement Form

***Declination Statement**

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to me; however, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine I continue to be at risk of acquiring hepatitis B, a serious disease. If, in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

Employee Name: _____

Employee Signature: _____ Date: _____

*Taken from: Bloodborne Pathogens and Acute Care Facilities. OSHA Publication 3128.

APPENDIX B

TEI – Exposure Incident Form

 Exposure Incident Report Page 1 of 2		Date Report Completed: 	
		Completed By: 	
Please Print Legibly			
Exposed Employee's Full Name:		Date of Birth:	Home Phone:
Job Title:		Date of Exposure:	Time of Exposure:
Exposed Employee's Hepatitis Vaccination Status:			
Location of Incident (jobsite name, street, city, pole #, etc.) - Be Specific:			
Describe what task(s) were being performed when the exposure occurred – Be Specific:			
Was the exposed individual wearing Personal Protective Equipment? _____ Yes _____ No		If Yes, list all PPE being utilized: 	
Did the PPE Fail? _____ Yes _____ No		If yes, explain how: 	
Which body fluids did the exposed individual contact (i.e., blood, vomit, etc.) – Be Specific:			
What parts of the body were exposed or came in contact with the blood or potentially infectious materials? – Be Specific:			
Estimate the percent (%) of body surface that was exposed:		How long was it exposed?	
Did a foreign body (machine part, wire, glass, needle, etc.) penetrate the skin? _____ Yes _____ No		If yes, what was the object & where did it penetrate? – Be Specific: 	
Was any fluid injected under the skin? _____ Yes _____ No _____ Unknown		If yes, what fluid & how much? 	
What first aid activities were implemented after exposure?			

APPENDIX B

TEI – Exposure Incident Form



Exposure Incident Report

Page 2 of 2

Please Print Legibly

Source Individual Identified?

_____ Yes _____ No

Name of Source Individual:

Source Hepatitis B Vaccination Status:

Did source individual agree verbally to be tested:

_____ Yes _____ No

TEI Safety notified (list name)?

_____ Yes _____ No

Medical evaluation on individual(s) performed?

_____ Yes _____ No

If yes, what is the name of the facility?

If no, explain in detail:

Any additional comments, information deemed important to the exposure:

Signatures

Exposed Employee:

Foreman:

General Foreman:

Safety:

Division Manager:

VP of Operations:

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	• Origination	Safety Div.	Vice President		08/01/12
01	• Revised & Updated PPE Section; Included Proper Sequence of Doffing PPE; Revised & Updated Exposure Incident Report	Safety Div.	Vice President	12/28/12	01/31/13
02	• Removed Title Safety Manager & replaced with Safety Director; Defined Supervisory Personnel	Safety Div.	Vice President	05/15/13	01/31/14
03	• Vice President responsibilities relegated to Division Managers	Safety Div.	Safety Director	07/01/16	07/01/16
04	• Redefined the roles of Division Management for the TEI BBP Exposure Control Plan • Included the Vice President of Operations in the annual review of this policy • Added Hand Hygiene poster & Handout on Tips to Prevent Exposure to BBPs	Safety Div.	Management w/Safety	09/2020	09/2020
05	• Annual Review – No Changes N/A	Safety Div.	Management w/Safety	11/2021	11/2021
06	• Reformatted entire document • All changes listed in 2025 Annual Update Changes - BBP	Mike Tortorella	Management w/ Safety	01/2025	01/2025



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362

Confined Space Written Program

Permit & Non-Permit

TEI PROGRAM SAFETY-005 Confined Space R4 202412

1) Introduction

- a)** Confined Spaces are located at work sites with new and on-going construction, work-sites for maintenance, jobs involving repairs and construction. Due to the diversity of our work sites the hazards associated with confined spaces are variable and need to be constantly reviewed with processes and procedures altered and/or updated accordingly.
- b)** This document has been developed to ensure the safety of all personnel required to enter and conduct work in confined spaces. This safety program outlines reasonable and necessary policies and procedures for any Thompson Electric (TEI) employee, contractors, and vendors (regardless of status) who are associated with confined space entry operations.
- c)** This written program and procedure provides guidelines for:
 - i)** Provisions for training;
 - ii)** Areas of responsibility for Executive Leadership, Division Management, Safety Department, Entrants, Attendants, Entry Supervisors, Authorized Person(s), and Affected Persons;
 - iii)** Recordkeeping requirements;
 - iv)** Identifying confined spaces;
 - v)** Evaluating confined spaces as to Permit or Non-Permit required;
 - vi)** Entry into confined spaces;
 - vii)** Details on the hazards of confined spaces;
 - viii)** Requirements for Permit-Required confined space entry.
- d)** This program, all parts of 29 CFR 1910.146, and 29 CFR 1926 Subpart AA (where applicable) shall apply to all confined space entry operations as conducted at Thompson Electric applicable work-site locations. TEI requires conformance with the safety standards set herein. A site-specific and/or job specific program may be utilized, providing it meets or exceeds the requirements set forth in this policy.

2) Policy

- a)** It is the policy of TEI to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public. Therefore, at each TEI facility and/or jobsite, confined spaces shall be:
 - i)** Identified, and as applicable; Permitted and posted with warning signs.
- b)** When confined space hazards exist that cannot be eliminated, then:
 - i)** Engineering practices;
 - ii)** Administrative practices, and;
 - iii)** Personal Protective Equipment (PPE).
- c)** These measures will be implemented to minimize those hazards to ensure the safety of employees and other Affected individuals.
- d)** Only employees trained and equipped as outlined in this program and procedures shall enter, monitor or perform work in confined spaces.
- e)** TEI has adopted, and enforces the following policies as they relate to our confined space work activities:
 - i)** In order to ensure the safety of our employees and the employees of our host employers and other contractors, TEI will not conduct operations in any confined space (permit or non-permit) that involves multiple employers. If work is to be performed within our permitted or non-permitted confined space by other than TEI employees, the attendant shall:
 - (1) Evacuate the space immediately
 - (2) Close the TEI Confined Space permit; and
 - (3) Contact the Confined Space Supervisor for instruction on any subsequent entry after the space has been evacuated by the non-TEI personnel.

- ii) TEI will not perform any work in any confined space where Immediately Dangerous to Life and Health conditions exist.

3) Definitions

- a) **Attendant** – An employee designated to remain outside the confined space and maintain constant communication with those inside. This person shall be trained in First Aid, CPR and in all confined space procedures, and have emergency phone numbers immediately available.
- b) **Atmospheric Testing Equipment** – Used to monitor levels of oxygen, and flammable, combustible and toxic gases prior to and during work in confined space.
- c) **Authorized Entrant/Employee** – An employee who is authorized by TEI Safety to enter a confined space.
- d) **Body Harness** – Part of a fall protection system to distribute the impact of a fall over a large area of the body. It has adjustable leg and shoulder straps and a D ring in the back for attaching a lifeline. It can be used to pull an unconscious or disabled employee from a confined space.
- e) **Competent Person** – One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.
- f) **Confined Space** – A space that is:
 - i) Large enough and so configured that an employee can bodily enter and perform work;
 - ii) Has limited or restricted means for entry or exit; and
 - iii) Is not designed for continuous employee occupancy.
- g) **Entry** – The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.
- h) **Entry Permit** – The written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified by this program.
- i) **Entry Supervisor** – Designated representative responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this program.
 - i) NOTE: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this program for each role they fill. Also, the duties of entry supervisor may be passed from one individual to another during the course of entry operation.
- j) **Hazardous Atmosphere** – An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is escape unaided from a permit space), injury or acute illness.
- k) **Hot Work** – Any work involving burning, welding or similar fire-producing operations. Also, any work that produces a source of ignition, such as grinding, drilling, or heating.
- l) **Hot Work Permit** – A permit allowing employees to perform work involving welding, cutting, riveting, or any task that would deplete oxygen, create toxic fumes and vapors, or create potential for fire or explosion. (See Appendix A).
- m) **Immediately Dangerous to Life or Health** – An atmosphere that poses an immediate threat of loss of life: May result in irreversible or immediate severe health effects; may result in eye damage/irritation; or other condition that could impair escape from a confined space.
- n) **Lower Explosive Limit (LEL)** – The minimum concentration of a combustible/flammable gas or vapor in air that will ignite if an ignition source is present.
- o) **Lifeline** – Line attached to the employee in a confined space to remove him or her if unconscious or disabled.

- p) **Non-Permit Required Confined Space** – A confined space that does not contain, nor has the potential to contain, any hazard capable of causing death or serious physical harm (with respect to atmospheric hazards).
- q) **Oxygen Deficient Atmosphere/ Oxygen Deficiency** – An atmosphere containing oxygen at a concentration of less than 19.5% by volume as measured by an oxygen-measuring device.
- r) **Oxygen Enriched Atmosphere/ Oxygen Maximum** – An atmosphere containing oxygen at a concentration of more than 23.5% by volume as measured by an oxygen measuring device.
- s) **PEL–Permissible Exposure Level** – Concentration of a substance to which an individual may be exposed repeatedly without adverse effects.
- t) **PPE** – Personal Protective Equipment – Any devices or clothing worn by the worker to protect against hazards in the environment (i.e., respirators, gloves, and chemical splash goggles).
- u) **Permit Required Confined Space** – A confined space that has one or more of the following characteristics:
 - i) Contains or has a potential to contain a hazardous atmosphere;
 - ii) Contains a material that has the potential for engulfing an entrant;
 - iii) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly-converging walls or by a floor that slopes downward and tapers to a smaller cross-section; or
 - iv) Contains any other recognized serious safety or health hazard.
- v) **Purging** – The removal of gases or vapors from a confined space by the process of displacement.
- w) **Upper Explosive Limit (UEL)** – The maximum concentration of a combustible/flammable gas or vapor in air before its saturation point that will ignite if an ignition source is present.

4) Program Administration

- a) Executive Leadership shall be responsible for the following:
 - i) Review and approve this written program for implementation.
 - ii) Provide support in the enforcement of this program across all divisions of TEI.
- b) TEI Safety Department shall be responsible for the following:
 - i) Review and update of TEI's Confined Space Entry Program to conform to current CFR standards, at a minimum annually.
 - ii) Ensure compliance with standards set forth in this program and policies by periodic inspection of entry sites and canceling permits where unsafe conditions are present.
 - iii) Identifying confined spaces within existing facilities and on applicable construction work-sites, or existing TEI permanent facilities.
 - (1) Identifying hazards within a confined space under TEI's control.
 - iv) Conduct training and maintain documentation for both affected and authorized employees.
 - v) Obtaining and maintaining all equipment necessary to complete the confined-space entry project.
- c) Division Management shall be responsible for the following:
 - i) Managers/Supervisors will not allow any employee, who has not received the required training, to perform any of the tasks or activities associated with this safety policy and procedure.
 - ii) Communicating appropriate needs to TEI Safety Department.
 - iii) Ensuring permit-required confined spaces are posted with approved warning signs.
 - iv) Ensuring that all employees are provided with ANSI and NIOSH approved PPE as necessary for their job and has received the appropriate training for the assigned PPE.
 - v) Ensuring that only employees trained and qualified will operate any equipment included in the confined space scope of work as described on the relevant permit.

- d) All Employees shall be responsible for the following:
 - i) Complying with all applicable guidelines contained in this safety policy and its related procedures.
 - ii) Knowing where confined spaces are located in their work area/existing structure.
 - iii) Following all instructions pertaining to confined spaces.
 - iv) Never enter confined spaces unless authorized by training and job duties.
- e) Authorized Entrants shall be responsible for:
 - i) Knowledge of the hazards that may be faced during the entry, including, the modes, signs or symptoms, and consequences of the exposure.
 - ii) Proper use of the equipment, which includes:
 - (1) Atmospheric testing and monitoring equipment.
 - (2) Ventilating equipment needed to obtain acceptable entry conditions.
 - (3) Communication equipment necessary to maintain contact with standby person.
 - (4) Personal protective equipment as needed.
 - (5) Lighting equipment as needed.
 - (6) Barriers and shields as needed.
 - (7) Equipment, such as ladders, needed for safe ingress and egress.
 - (8) Rescue and emergency equipment as needed (i.e., tripod).
 - (9) Any other equipment necessary for safe entry into and rescue from permit spaces.
 - iii) Communication with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space if required.
 - iv) Alert the attendant whenever:
 - (1) The entrant recognizes any warning sign or symptoms of exposure to a dangerous situation, or;
 - (2) The entrant detects a prohibited condition.
 - v) Exiting the permit space as quickly as possible whenever:
 - (1) An order to evacuate has been given by the attendant or the entry supervisor;
 - (2) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation;
 - (3) The entrant detects a prohibited condition; or
 - (4) An evacuation alarm is activated.
- f) Attendants shall be responsible for:
 - i) Knowledge of the hazards that may be faced during the entry, including, the modes, signs or symptoms, and consequences of possible exposure.
 - ii) Knowledge of possible behavioral effects of hazard exposure in authorized entrants (i.e., heat stress, hypothermia).
 - iii) Continuously maintaining an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants accurately identifies who is in the permit space (i.e., sign-in/sign-out log), if necessary.
 - iv) Remains outside the permit space during entry operations until relieved by another authorized attendant.
 - v) Attempting non-entry rescue if proper equipment is in place and the rescue attempt will not present further hazards to entrant or attendant.
 - vi) Communicating with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space when conditions warrant.

- vii) Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and ordering the authorized entrants to evacuate the space immediately under any of the following conditions:
 - (1) If the attendant detects a prohibited condition;
 - (2) If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
 - (3) If the attendant detects a situation outside the space that could endanger the authorized entrants;
 - (4) If the attendant cannot effectively and safely perform all the duties required by this program.
 - (5) Unauthorized entry into the space by any person.
- viii) Summoning the rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.
- ix) Taking the following actions when unauthorized person(s) approach or enter a permit space while entry is underway:
 - (1) Warn the unauthorized person(s) that they must stay away from the permit space;
 - (2) Advise the unauthorized person(s) that they are not permitted to enter the permit space under any circumstances;
 - (3) Inform the unauthorized entrant(s) and the entry supervisor if unauthorized persons have entered the permit space.
- x) Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.
- xi) When monitoring multiple spaces at one time, the assigned attendant shall consult and follow the established guidelines developed and outlined in Section 12.0 of this policy and procedure. If all aspects of the established guidelines cannot be met by the attendant then said attendant shall report the situation to his/her assigned Confined Space Entry Supervisor and not allow entry into the space until all said guidelines and requirements can be met and the Confined Space Entry Supervisor has signed the permit.
- g) Entry Supervisors shall be responsible for:
 - i) Ensuring that only employees who are trained (by verifying documentation of training) are allowed to attend to or enter confined spaces.
 - ii) Identifying confined spaces;
 - iii) Evaluating confined spaces as to Permit or Non-Permit required;
 - iv) Overseeing requirements for entry into confined spaces;
 - v) Ensuring all details on the hazards of the confined space are properly documented, reviewed and addressed on the permit prior to authorizing entry;
 - vi) Spot auditing the Confined Space during entry to ensure all provisions of the permit are being met.
 - vii) Ensuring permits are properly completed, and safety procedures are followed at the jobsite.
 - viii) Ensuring that all safety precautions, rescue procedures, and safety equipment needed for the operation are in place and functional at the time of the entry into the confined space.
 - ix) Preparing, issuing, use, cancellation and retention of all Confined Space permits per this policy.

5) Training & Recordkeeping Requirements

- a) The formal written confined space training program is to provide employees with the necessary understanding, skills, and knowledge to safely perform their jobs. The components of this formal written training program include instruction on:
 - i) Types of confined spaces

- ii) Confined space hazards
- iii) Atmospheric testing of confined spaces
- iv) Cleaning and ventilation
- v) Lockout of confined spaces
- vi) Personal Protective Equipment (PPE)
- vii) Communication procedures
- viii) Emergency rescue and procedures
- ix) Hot work
- b) Initial and refresher training are to be provided to all employees. Refresher training must be conducted whenever:
 - i) Annual re-training is due;
 - ii) An employee's duties change;
 - iii) Special deviations have occurred;
 - iv) An evaluation of the confined space entry program identifies inadequacies in the employee's knowledge.
- c) Authorized employees will be trained at a minimum in the following:
 - i) Emergency entry and exit procedures;
 - ii) Applicable respirators;
 - iii) First Aid and CPR (when applicable);
 - iv) Lockout barriers at work areas;
 - v) Safety equipment use;
 - vi) Rescue equipment;
 - vii) Permit system;
 - viii) Work practices;
 - ix) Atmospheric testing methods;
 - x) Meter calibration;
 - xi) Atmospheric behaviors of oxygen, combustible, and toxic gases, and;
 - xii) Authorized employees shall receive initial and refresher training every 3 years.
- d) All training shall be documented. The specific Recordkeeping Requirements for this policy and its related procedures shall include, but not be limited to:
 - i) Retaining each cancelled permit for at least one year to facilitate Thompson Electric's audit and review of its Permit-Required Confined Spaces program.
 - ii) Documenting problems encountered during entry on the relevant permit during the post job/entry meeting to facilitate revisions to this program and any related policies.
 - iii) Certification of training for each employee with name, identity of trainers and training dates.
 - iv) Reclassification from permit to non-permit space certification with date, location, and signature of person making determination.

6) Confined Spaces - General

- a) At Thompson Electric, Inc. all Confined Spaces shall be considered potentially dangerous and therefore "Permit-Required" until pre-entry procedures demonstrate otherwise.
 - i) The danger associated with entry may come from chemical or physical hazards within the space. Including those introduced by the entrants into the space in the scope of the work they are performing (i.e., cleaning agents, jack hammer, hot work activity, etc.).
- b) A Non-Permit Confined Space is a confined space that does not contain, nor has the potential to contain, any hazard capable of causing death or serious physical harm (with respect to atmospheric hazards).

- c) Based on the definition, many types of spaces may be considered “confined” and therefore hazardous. Some examples of confined spaces might be sewers, manhole, trenches, electrical vaults, tunnel, or other similar confined spaces.

7) Evaluating Confined Spaces

- a) Once all confined spaces have been identified, then those confined spaces must be evaluated to determine the hazards that may be present. Hazardous atmospheres and general safety hazards must be evaluated for all confined spaces.
- b) A hazardous atmospheric evaluation must be performed by conducting atmospheric testing to assess the conditions in the confined space. We have included atmospheric testing procedures that should be followed by an authorized employee. Results of the atmospheric testing should be documented.
 - i) Atmospheric Hazards affect the air in the space and can be flammable, toxic, corrosive, or asphyxiating. These hazards may be present prior to entry or be introduced by the entrant’s work scope.
- c) General safety hazards should be assessed by physical observation. This physical observation by an authorized person should include a visual assessment of the hazards.
- d) The assessment should be based on knowing the existing conditions and intended use of the confined space along with the actual and potential hazards posed by materials and substances in the confined space. A “Confined Space Evaluation” form should be utilized to aid in this assessment.
- e) If a change in use or configuration of a non-permit-required confined space increased hazards to entrants, then the space must be re-evaluated for possible reclassification to a permit-required confined space.
- f) A permit-required confined space may be reclassified to a non-permit-required confined space if:
 - i) The permit-required confined space poses no atmospheric hazards and all non-atmospheric hazards are eliminated without entry.
 - ii) Entry is necessary to eliminate hazards and such entry is performed in accordance with the confined space entry program, and testing and inspection during entry indicate that hazards have been eliminated.
 - iii) The basis for determining that all hazards are eliminated is documented and certified.
 - iv) Reclassification is effective as long as the hazards remains eliminated, and the Confined Space Supervisor has signed off on the permit and all related paperwork.

8) Confined Space Hazards

- a) Confined Spaces present many hazards to employees due to the nature of the space’s shape, size, lack of ventilation, proximity to toxic gases, and other contributing substances. Every confined space must be evaluated for these four types of hazards:
 - i) Oxygen-Deficient Atmospheres
 - ii) Flammable Atmospheres
 - iii) Toxic Atmospheres
 - iv) Mechanical and Physical Hazards.
- b) An atmosphere containing less than 19.5% oxygen shall be considered oxygen- deficient. The oxygen level inside a confined space may be decreased as the result of either consumption or displacement. Some of the processes that consume oxygen in a confined space include:
 - i) Combustion of flammable materials, as in welding, cutting, or brazing;
 - ii) The number of people working in a confined space and the amount of physical activity, and;
 - iii) Oxidation of metals within the space.

- c) Oxygen-enriched atmospheres are those atmospheres that contain an oxygen concentration greater than 23.5%. An oxygen-enriched atmosphere will cause flammable materials such as clothing and hair to burn violently when ignited.
- d) Flammable Atmospheres are generally the result of flammable gases, vapors, and/or dust mixed in certain concentrations with air.
 - i) Combustible gases or vapors can accumulate within a confined space when there is inadequate ventilation. Gases that are heavier than air will accumulate in the lower levels of a confined space. Therefore, it is especially important that atmospheric tests be conducted near the bottom of all confined spaces. Gases that are lighter than air would naturally be found towards the top of the confined space; therefore, testing should be performed at 3 levels within the confined space.
 - ii) The work being conducted in a confined space can generate a flammable atmosphere. Work such as spray-painting, coating, or the use of flammable solvents for cleaning can result in the formation of an explosive atmosphere. Welding or cutting with oxyacetylene equipment can also be the cause of an explosion in a confined space and shall not be allowed without a hot work permit. Oxygen and acetylene hoses may have small leaks in them, which could generate an explosive atmosphere and, therefore, should be removed when not in use. The atmosphere shall be tested continuously while any “hot work” is being conducted within a confined space.
- e) Toxic Atmospheres may be present within a confined space as the result of one or more of the following:
 - i) The product stored in the confined space. When a product is stored in a confined space, the product can be absorbed by the walls and give off toxic vapors when removed or when cleaning the residual material. The product can also produce toxic vapors that will remain in the atmosphere due to poor ventilation.
 - ii) The work being conducted in the confined space. Toxic atmospheres can be generated as the result of work being conducted inside the confined space. Examples of such work include: Welding or brazing with metals capable of producing toxic vapors, painting, scraping, sanding, etc. Many of the solvents used for cleaning and/or degreasing produce highly toxic vapors.
 - iii) Areas adjacent to the confined space. Toxic fumes produced by processes near the confined space may enter and accumulate in the confined space. For example, if the confined space is lower than the adjacent area and the toxic fume is heavier than air, the toxic fume may “settle” into the confined space.
- f) Mechanical and physical hazards such as rotating or moving mechanical parts or energy sources can create hazards within a confined space. All rotating or moving equipment such as pumps, process lines, electrical sources, etc., within a confined space must be identified.
- g) Physical factors such as heat, cold, noise, vibration, and fatigue can contribute to accidents. These factors must be evaluated for all confined spaces.
- h) Excavations could present the possibility of engulfment. Employees shall be protected from cave-ins by sloping, benching, or shoring systems when the depth of the excavation is more than five feet, in accordance with 29 CFR 1926.652.
- i) If hot work is to be conducted inside the confined space, all entry team members must be trained in hot work and must comply with TEI’s Hot Work Written Program.

9) Permit Required Confined Space Entry Requirements

- a)** Per paragraph 6 (a) of this program, all spaces are to be considered permit-required until deemed otherwise by a Competent Person. No TEI facilities contain confined spaces thus, this program excludes inventorying and labeling spaces. Entry requirements, however, must meet OSHA 1910 & 1926 standards, at minimum.
 - i)** A competent person (as defined in this plan) must authorize entry, prepare and sign written permits, order corrective measures if necessary, and cancel permits when work is completed.
 - ii)** The entry permit is completed and posted in a conspicuous location near the entrance of the space prior to entry.
 - iii)** Permits must be available to all permit space entrants at the time of entry and should extend only for the duration of the task.
 - iv)** Cancelled permits must be retained for a year to facilitate the annual review of TEI's Confined Space Program.
 - v)** A copy of this policy will be available at each work area/structure.
 - vi)** If welding is to be performed in the confined space (permit-required or non-permit required), a hot work permit must also be obtained, completed and posted at the entry to the applicable confined space.
- b)** Pre-entry atmospheric testing for the confined space shall be performed by the Entry Supervisor or other authorized person prior to entry.
 - i)** Consult Appendix section for atmospheric testing procedures.
 - ii)** All entrants are to be given an opportunity to participate in and review calibrated air monitoring data prior to entry. The air shall be periodically tested (time frame to be defined on permit) while continuous ventilation is applied. Air monitoring results will be documented on the entry permit at a frequency appropriate for the hazards of the space but will not exceed one hour.
 - (1) It should be noted that any employee (regardless of status – entrant, attendant, supervisor) can request additional monitoring at any time. Such situation should be noted in the comments section on the permit.
 - iii)** If a toxic substance is determined to be in the confined space during testing by the entry team, the Confined Space Supervisor will be contacted to provide help in obtaining a Material Safety Data Sheet or other chemical information to determine what type of personal protective equipment is required, the potential health effects, the Permissible Exposure Limits (PEL), and any other information needed to safely conduct the work.
- c)** Energy sources will be completely isolated by physical disconnection, double blocking, bleeding, or by lockout/tagout procedures. Reference TEI's Hazardous Energy Control Plan for the approved processes and procedures isolating energy sources.
- d)** Ventilation and cleaning shall be performed to empty, flush, or purge spaces from the outside if feasible.
 - i)** TEI still requires testing and monitoring of all confined spaces, even if documentation (i.e., Gas Free Certificate) is issued indicating that the space has been purged or cleaned. Such certifications should only be taken as an indication that a unit or space has been cleaned and should not be taken as a guarantee that the internal atmosphere will continue to be safe.
 - ii)** Indicate whether mechanical or natural ventilation will be used. Describe the procedures to be used. Efficiency of ventilation shall be checked by re-testing the atmosphere (as outlined on the permit) prior to entry.

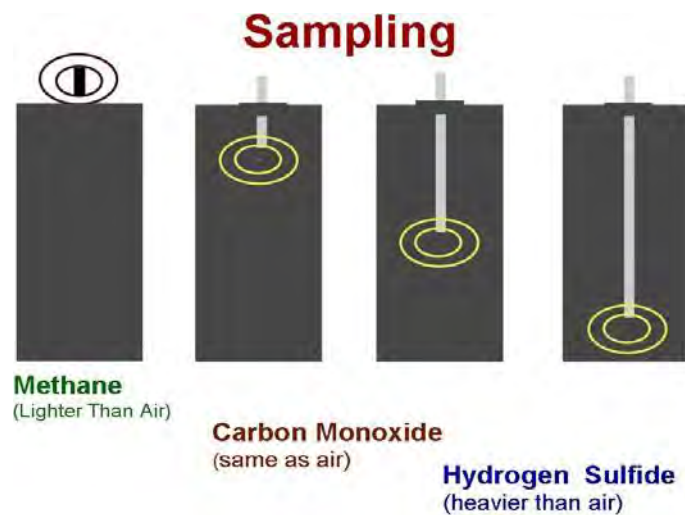
- iii) Where ventilation is used to improve the air in a confined space, the Entry Supervisor shall ensure that the toxic or flammable gases or vapors (i.e., bad air) removed from the space do not pose a risk to other workers. "Bad Air" should not be discharged into another work area or near an ignition source.
 - iv) In the case of explosive gases or vapors, mechanical ventilators should be bonded to the confined space or explosion-proof fans and/or ventilators utilized (specially designed fans operated by electricity or compressed air).
 - v) The ventilation equipment should be capable of providing an air change every 15 seconds and easily dilute or displace most dangerous atmospheres.
 - vi) When a hazardous atmosphere is detected, ventilation will continue until:
 - (1) The space has no harmful concentration of toxic gases or vapors and acceptable oxygen concentrations have been obtained.
 - (2) The atmosphere is tested 3 times and safe levels are maintained; once this is achieved entry may occur.
 - vii) Safety Data Sheets (SDS) for any chemicals present, removed, or to be used in a confined space shall be available to all affected employees. Refer to TEI's Hazard Communication/GHS Written Program for additional information regarding SDS and hazardous chemicals.
- e) The appropriate PPE should be worn based on the hazard(s) of the space and may include:
 - i) Eye and Face Protection
 - ii) Head Protection
 - iii) Foot and Leg Protection
 - iv) Body Protection
 - v) Hearing Protection
 - vi) Respiratory Protection
 - vii) Hand and Arm Protection
 - viii) Harness, Safety Belts, and Lifelines
 - ix) Refer to TEI's PPE Written Program for additional information regarding required PPE.
- f) Appropriate equipment and tools must be in place and in good condition.
- g) Having Attendants in place. A trained and authorized Attendant is mandatory for entry into any confined space. The attendant shall be stationed immediately outside permit-required confined spaces and shall:
 - i) Remain outside the confined space at all times;
 - ii) Be within sight, or call, of all entrants unless other means of communication have been established, approved and outlined on the permit;
 - iii) Assure that all personnel entering and leaving the confined space sign in and out in the area provided on the back of the confined space entry permit.
 - iv) Have ultimate authority to stop work and evacuate the space if conditions change during the life of the permit (i.e., vapor cloud develops or a suspicious odor is detected) or entrants fail to meet the requirements of the permit (i.e., failure to wear assigned PPE).
 - v) Have means to summon assistance;
 - vi) Have safety and rescue equipment on hand.
 - vii) The attendant shall be physically capable of assisting any employee inside the confined space in the event of an emergency (while not entering the confined space). This individual will be responsible for alerting others that a rescue is in progress and for taking appropriate measures to ensure the safety of all co-workers in the area.

- viii) No employee (other than the company Authorized Rescue Team) is to enter a confined space if another employee is unresponsive or incapacitated. The attendant shall always seek assistance as outlined in this plan and established on the permit. The means of communication for rescue or emergency needs shall be radio, cell phone, customer phone.
- h) Rescue teams must be available for permit-required confined spaces. The Rescue Team is responsible for rescuing any Confined Space Entrant, if necessary. (See section 12 of this program for additional rescue team requirements). Rescue Teams will:
 - i) When feasible provided by the host employer;
 - ii) Always follow company procedures;
 - iii) Must be trained in confined space rescue that requires entry;
 - (1) TEI employees will only be trained in assisted rescue that does not require entry into the space i.e., tripod/Durahoist and retrieval SRD use.
 - iv) Know and have current certification in First Aid/CPR;
 - v) Be able to use all necessary rescue equipment and rescue techniques;
 - vi) Where practical all personnel entering a confined space should be equipped with a retrieval line secured at one end to the entrant by a full-body harness with its other end secured to a tripod lifting hoist.

10) Preparing the Confined Space for Entry

- a) If warning signs or barriers are to be used to prevent unauthorized entry or to protect entrants from external hazards such as pedestrians and vehicles, they should be placed on or around the confined space.
- b) Place all tools, safety equipment, monitoring equipment, etc., near the confined space.
- c) Isolate all mechanical and/or electrical hazards in accordance with TEI's LOTO program.
- d) Purge/ventilate the confined space.
- e) The entry supervisor will test the atmosphere as outlined in this program utilizing TEI's MSA Altair 5x Multi-gas Detectors.
 - i) All testing equipment shall be calibrated by a Competent Person as instructed by the manufacturer. All of the manufacturer's operating instructions shall be followed.
 - ii) The test equipment should be tested in a known clean/acceptable atmosphere to ensure its accuracy.
 - iii) Ventilation equipment must be shut off prior to conducting any atmospheric pre- entry testing.
 - iv) The atmosphere must be tested at the bottom, top, and middle of all confined spaces.
 - v) The atmosphere must be continuously monitored while work is being conducted in the confined space.
 - vi) If the confined space is left for any reason, the atmosphere must be re-tested before re-entering the space.
 - vii) If oxygen content is less than 19.5% or greater than 23.5%, perform additional ventilation. The space may not be entered until O₂ readings are within range.
 - viii) If oxygen content is between 19.5% and 23.5%, continue entry preparation.
- f) The Entry Supervisor will test for flammable gas level.
 - i) If the meter reading is less than 10% of the lower explosive limit (LEL), continue entry preparations.
 - ii) If the meter reading is above 10% of the LEL, continue ventilation of the confined space.
 - iii) If the meter reading is still above 10% of the LEL, the confined space must be cleaned before entry is permitted.

- (a) TEI does not perform this type of work. The host employer or an outside contractor shall be responsible for preparing the space and cleaning flammable, toxic, or other hazardous atmospheres from the space.
- g) The Entry Supervisor will determine the toxicity of the atmosphere.
 - i) If a toxic atmosphere is present, no person should be permitted to enter the confined space at a level exceeding the Permissible Exposure Limit (PEL) and/or the Time Weighted Average (TWA) without proper Personal Protective Equipment. The Confined Space Supervisor or designated safety representative should be contacted to assist in identifying proper precautions and the protective measures to be taken.
 - ii) TEI does not perform work in spaces that are consider IDLH.
- h) The illustration below shows examples of hazardous gases and how to appropriately monitor for them at different levels of the confined space.



- i) Assemble all personnel involved and review rescue procedures.
- j) The Entry Supervisor will add any needed information, then complete and sign the permit. All personnel/contractors will be shown the permit and informed of any additions, changes, related permits (i.e., hot work, safe work, etc.).

11) Planning for Emergencies

- a) Before authorizing workers to enter a permit space, you must be sure that experienced emergency responders will be available if an entrant needs help. Responders must be able to reach the worksite promptly and know how to deal with the emergency effectively. Most fire departments are not equipped to respond to confined space emergencies.
 - i) The local fire department must be contacted prior to listing them as a rescue service. They are to be informed of the confined space entry and must determine if they are able to provide appropriate and timely rescue services.
 - ii) "911" is not an acceptable entry for the "Rescue and Emergency Services Available" section of the TEI Confined Space Entry Permit.
- b) You can choose either an on-site (host employer) or an off-site responder. The responder must meet and adhere to all requirements outlined in sections 6.0 and 7.0 of this policy and procedure.
- c) Any rescue team (host employer, fire department, contractor) will be afforded the opportunity to inspect the space prior to entry and make a determination of the appropriate rescue procedures. These entities may also revise entry procedures to ensure entry team health and safety.

12) What to Do When Work Ceases

- a) When work ceases for breaks or end of shift, all sources of potential hazard must be removed from the space and the area rendered safe.
 - i) Equipment such as welding equipment, grinders, spray painting guns or potentially hazardous products such as paints or surface treatments must be removed.
 - ii) Gas lines for cutting and welding equipment must be turned off and removed.
 - iii) Electrical supplies shall be turned off. However, during short breaks low voltage electricity may be maintained for lighting, as would any equipment for the monitoring of the internal atmosphere.
 - iv) Upon completion of the confined space work, it is necessary for all personnel to be accounted for prior to the entry permit being signed off, cancelled, and submitted to the confined space supervisor.

13) Heat Stress & Confined Space Work

- a) Heat stress must be considered as a potential hazard associated with a confined space. Steam lines, equipment, etc. located in confined spaces may increase the ambient heat load of that confined space. Personal Protective Equipment (PPE) worn by Entrants may also increase the likelihood of heat stress by trapping body heat. The level of activity required by Entrants, worker acclimatization to heat, and individual physical condition will also affect potential for development of heat-related disorders.
- b) Personnel who must work in hot environments should exit the confined space at regular intervals for short rest breaks including water or an electrolyte replacement drink. Liquids should be cool but not cold. The Confined Space Supervisor will assist entry teams in assessing the heat stress potential and any plan of action prior to entry.
- c) For additional information on Heat Stress and Response, see TEI's Heat Stress and Response Written Program.

14) Monitoring Multiple Permit Required Confined Spaces

- a) A confined space attendant may be responsible for monitoring more than one permit space at a time. If multiple spaces are required to be monitored by a single confined space attendant, then full compliance with these guidelines must be met prior to any entry being made into the permit spaces. If at any time during the entry compliance cannot be maintained, then the confined space attendant shall issue an order for all entrants to evacuate their spaces until full compliance can be re-established.
- b) The attendant must be able to effectively communicate with entrants in each space under their control.
 - i) A radio, pull rope, whistle, horn, or some other means of approved communication (by the confined space supervisor) must be established and in place for each space.
 - ii) In the event of an emergency, all spaces are to be evacuated immediately.
- c) If multiple permit-required confined spaces are monitored by one attendant, the attendant must be able to perform all standard attendant duties described throughout this program for each space under their control. These duties include but are not limited to:
 - i) Air monitoring and logging.
 - ii) Effective communication methods with entrants in all spaces.
 - iii) Preventing unauthorized entries.
- d) If the attendant cannot perform all attendant duties for each space, all entries must be halted and a sufficient number of attendants must be provided or fewer simultaneous entries occur so that the single attendant can sufficient attend the spaces and entrants.

Appendix A – TEI Confined Space Entry Permit

TEI's Confined Space Entry Permit is shown below. All fields of the permit must have a response, even if the response is NA (not applicable). The permit is to be completed prior to entry and signed by the entry supervisor to cancel the permit as needed. The permits will be distributed by TEI Safety with the rest of the required confined space entry equipment.

This is an example of a CONFINED SPACE ENTRY PERMIT. The actual entry permit you will use depends on the atmospheric and physical hazards of that particular confined space. All regulations for that permit are addressed in 29 CFR Part 1910.146 Permit-Required Confined Spaces for General Industry and 1926.1206 Confined Spaces in Construction.

CONFINED SPACE ENTRY PERMIT

1. Permit Space to be Entered			
2. Purpose of Entry			
3. Date of Entry		Authorized Duration of Entry Permit	
4. Authorized Entrants			
5. Attendants(s)			
6. Name of Current Entry Supervisor(s)			
7. Record hazards of the permit space to be entered.			
8. Check or list the measures used to isolate the permit space and to eliminate or control permit space hazards before entry.			

Hazard	Yes	No	N/A
A. Lack of Oxygen			
B. Combustible Gases			
C. Combustible Vapors			
D. Combustible Dusts			
E. Toxic Gases			
F. Toxic Vapors			
G. Chemical Contact			
H. Electrical Hazards			
I. Mechanical Exposure			
J. Temperature			
K. Engulfment			
L. Entrapment			
M. Others			

☐ A. Purge-Flush and Vent
☐ B. Ventilation
☐ C. Lockout/Tag Out
☐ D. Inerting
☐ E. Blanking, Blocking, Bleeding
☐ F. External Barricades
☐ G. Confined Space Identification/Signs
☐ H. Other

DO NOT DESTROY THIS PERMIT
AFTER CANCELLATION THIS ENTRY PERMIT MUST BE RETAINED
BY EMPLOYER FOR AT LEAST ONE YEAR.

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Appendix A – TEI Confined Space Entry Permit

Back of entry permit. For air monitor logging, an additional table shall be provided by TEI Safety due to the limited entry space on the permit. This additional log form shall be considered part of the permit and must accompany the permit during submission and retention.

10. Test(s) to be Taken						Permissible Entry Levels	Test 1	Test 2	Test 3	Test 4
A. Percent of Oxygen						19.5% to 23.5%				
B. Flammable Atmosphere						10% or less LFL				
C. Toxic Atmosphere Exposure						At or below PEL				
D.										
E.										
F.										
G.										
H.										
I.										
Name or Initials of Tester										
Test Times										

11. Rescue and Emergency Services Available:

Name _____ Name _____

Telephone _____ Telephone _____

12. Communication procedures to be used by authorized entrants and attendants.

13. Equipment supplied to the employee.

Yes	No	N/A	Equipment	Description
			(i) Atmospheric Test and Monitoring	Name _____ Model/Type _____ Serial/Unit No. _____
			(ii) Ventilating	
			(iii) Communications	
			(iv) Personal Protective Equipment	☐ Safety Harness with Life Lines ☐ Hard Hats ☐ Eye ☐ Ear ☐ Face ☐ Hand ☐ Foot ☐ Clothing ☐ Respiratory
			(v) Lighting	
			(vi) Barriers/Shields	☐ Pedestrian ☐ Vehicle ☐ Other
			(vii) Safe Ingress/Egress	☐ Ladders
			(viii) Rescue and Emergency	☐ Lifelines ☐ Hoists ☐ Medical/First-aid
			(ix) Other Safety Equipment	

14. Other information for this particular confined space to ensure employee safety.

15. Additional Permits Required. ☐ Hot Work ☐ Other

THIS CONFINED SPACE ENTRY PERMIT HAS BEEN CANCELLED:

BY _____ Entry Permit Supervisor _____ : _____ AM/PM _____ Date _____

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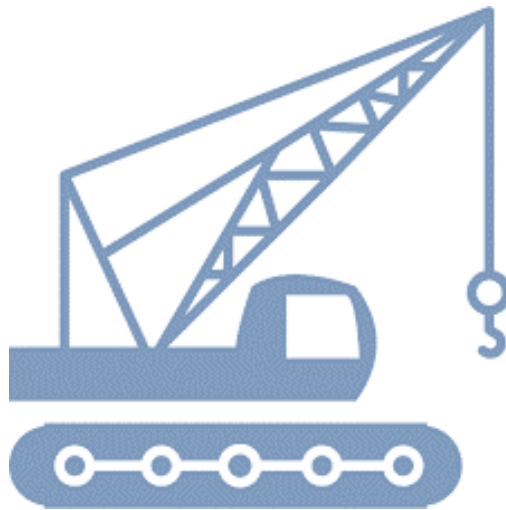
Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Origination	Safety Div.	Vice President		08/01/12
01	Revised Confined Space Profile Form to include "Purpose of Entry"	Safety Div.	Vice President	12/28/12	01/31/13
02	Updated Section 6.4 to require continuous monitoring even if Confined Space is declassified from "Permit" to "Non-Permit"	Safety Div.	Vice President	05/15/13	01/31/14
03	- Replaced Material Safety Data Sheets (MSDS) to reflect updated Safety Data Sheets (SDS) - Updated Hot Work Permit to reflect version currently in use along with directive for required record retention - Added provision outlining requirements for alternative safety training documentation - Moved placement of table for "Duties of Authorized Entrants, Attendants, & Supervisors" to immediately follow Section 1.0 Program Administration - Moved placement of "Confined Space Profile" form to immediately follow Section 4.0 "Evaluating Confined Spaces" - Inserted requirement that this form be completed and its submission requirement prior to any and all Confined Space work and issuing of Confined Space Equipment - Moved placement of "Confined Space Entry Checklist" to immediately follow Section 8.0 "Preparing the Confined Space for Entry" - Inserted requirement that this form be completed by the Attendant and Supervisor along with the Confined Space Permit and be retained with the Permit at the Space and then turned into Safety with the completed Confined Space Permit paperwork - Revised Checklist to include Supervisor and Attendant's Name - Removed Confined Space Program Elements Form Removed General Safe Work Permit Form	Safety Div.	Safety Director	12/20/19	12/20/19
04	Annual Review – No Changes	N/A	Management w/ Safety	N/A	N/A
05	- Various minor grammatical, spelling and formatting corrections - Major overhaul of program - For all changes, see 2024 Written Program Updates – Confined Space	Mike Tortorella	VP of Ops	12/24/24	01/06/25



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262

(330) 686-2300 F (330) 686-2362



Crane Safety

Rigging Program & Material Handling

2020-2021

Introduction

Cranes are an important category of machinery at Thompson Electric, Inc. (*herein referred to as TEI*) because of the productivity and economic benefits associated with their use. However, cranes can be dangerous pieces of equipment if basic hazards and rigging inspections and practices are ignored.

There is a high potential for serious accidents if cranes, hoists, and rigging devices are not inspected and used properly. This policy and procedure contains specific safety requirements for mitigating these adverse consequences. These requirements apply to Thompson Electric operations involving the use of cranes and hoists whether installed in or attached to buildings.

Slings, a component of hoisting and rigging systems, are used to lift and move loads. At TEI natural and synthetic fiber rope, and synthetic web slings are typically used. At times alloy steel chain, wire rope Slings which are capable of lifting tremendous loads may be employed.

- TEI has implemented this policy and its guidelines as a means of mitigating adverse consequences brought about by the improper, and unauthorized, use of cranes & rigging. Please note that this policy and its related procedures (TEI Standard Work Instruction #11) does not fully encompass all classifications of mobile cranes, Class VII Powered Industrial Trucks, their operators, oilers and riggers.
- Failure to follow TEI's Crane and Rigging Safety policy and its related procedures shall result in immediate disciplinary action as outlined in TEI' Discipline in Support of Safety program.
- This policy and its related SWI's, procedures, inspection guidelines, and usage applies to any and all Sub-Contractor employees.

Policy

This safety policy and procedure provides guidelines for:

- Avoiding hazards associated with crane and hoist operations.
 - Types of cranes/hoists;
 - Hazards common to cranes/hoists;
 - Crane & Hoist licensing requirements;
 - Crane/Hoist safety;
 - Crane & Hoist Safety Inspections.
- Providing guidelines for implementing an effective safe sling/rigging use program.
 - Understanding the attachments used with slings;
 - Inspecting slings;
 - Information and guidelines on sling repair requirements and subsequent removal from service.
- This document also details areas of responsibility for TEI Division Managers, Project Managers, Supervisory Personnel, and Employees.

This policy and procedure affects:

- Crane/Hoist and Class VII PIT operators, oilers, riggers, signalers, spotters and any employee or TEI Sub-Contractor who as a result of his or her job duties works with or near cranes, hoists, and Class VII Powered Industrial Trucks.
- Any TEI employee or Sub-contractor who uses any form of OSHA/Industry recognized rigging and related devices to lift, secure, and move loads.

For purposes of this policy and its related procedures and Standard Work Instructions the terminology "Crane" shall from this point forward include "Hoists" and "Class VII Powered Industrial Trucks" as related and recognized by OSHA

Crane Definitions

Accessory – An assembly of parts, which contributes to the overall function and usefulness of a machine.

Appointed – Assigned employee with specific responsibilities by the employer or the employer's representative.

Brake – A device used for retarding or stopping motion by friction or power means.

Cab – A housing which covers the rotating superstructure machinery and/or operator's station. On crane trucks a separate cab covers the driver's station.

Clutch – A friction, electromagnetic, hydraulic, pneumatic, or positive mechanical device for engagement or disengagement of power.

Conventional Rigging (Equipment) – Hardware or equipment used to safely attach a load to a lifting device. Conventional rigging is commercially available, over-the-counter equipment must be used in the manner for which it was designed.

Crane – A machine used for lifting and lowering a load vertically and moving it horizontally, and that has a hoisting mechanism as an integral part.

Designated – Selected or assigned by the employer or the employer's representative as being qualified to perform specific duties.

Drum – The cylindrical members around which ropes are wound for raising and lowering the load or boom.

Dynamic Loading – A load introduced into the machine or its components by forces in motion.

Hoist – A device that applies a force for lifting or lowering.

Load (Working Load) – The external load in pounds applied to the crane including the weight of load attaching equipment such as load blocks, shackles, and slings.

Load Ratings – Load ratings are the manufacturer's load capacity in pounds.

Reeving - A rope system in which the rope travels around drums and sheaves.

Rigger – A worker employed who is designated to make lifts exceeding the limits for which a licensed incidental crane and hoist operator or an intermediate crane operator is authorized.

Rope – A wire rope unless otherwise specified.

Side Loading – A load applied at an angle to the vertical plane of the boom.

Special Rigging – Non-conventional rigging. This would include any equipment built in-house or that is not commercially available.

Structural Competence – The ability of the machine and its components to withstand the stresses imposed by applied loads.

Tackle – An assembly of ropes and sheaves arranged for hoisting and pulling.

Tag Line – A line tied to a suspended load that is used to guide and manipulate the load.

Winch Head – A power driven spool for handling of loads by means of friction between fiber or wire rope and spool.

Specific Operating Practices

The Operator shall comply with the following rules while operating all classifications of cranes:

- Plan the operation before beginning work.
- The operator shall not engage in any practice which will divert his/her attention while actually engaged in operating the crane.
- When he or she is physically or mentally unfit, then the operator shall not engage in the operation of a crane.
- When applicable the operator shall respond to signals only from the appointed signal man, but shall obey a stop signal at any time, no matter who gives it.
- The operator shall be responsible for those operations under his/her direct control. Whenever safety is in question, the operator shall have the authority to stop and refuse to handle loads until safety has been addressed and assured to his/her satisfaction.
- **No load is to be moved** until the swing path and the landing site have been assured to be safe.
- **If a warning signal is furnished**, it shall be sounded each time before traveling and intermittently during travel, particularly when approaching employees.
- **Before leaving his/her crane unattended**, the operator shall:
 - Land any attached load, bucket, or other device.
 - Put controls in the OFF position.
 - Stop the engine.
 - Secure crane against accidental travel.
 - If there is a Lockout/Tagout sign on the switch or pendulum controls, the operator shall not close the switch or start the machine until the warning or lock has been removed by the person placing it there (see Thompson Electric's Lockout/Tagout Procedures).
 - Before closing the switch or starting the machine, the operator shall see that all controls are in the OFF position and all personnel are in the clear.
- **If power fails during operation**, the operator shall:
 - Set all brakes and locking devices.
 - Move all clutch or other power controls to the OFF position.
 - If practical, the suspended load should be landed under brake control.
- The operator shall familiarize him or herself with the equipment and its proper care. If adjustments or repairs are necessary, or any defects are known, he or she shall report the same promptly to Maintenance or the Field Superintendent. Also, notify the next operator of the defects.
- All controls shall be tested by the operator at the start of a new shift. If any controls do not operate properly, they shall be adjusted or repaired before operations are begun.

Moving Loads

- The load will be properly secured and balanced.
- The rope and multiple part lines will be straight, not kinked.
- Center the hook over the load to keep the cables from slipping out of the drum grooves and overlapping, and to prevent the load from swinging when it is lifted. Inspect the drum to verify that the cable is in the groove.
- The lifting action will be a smooth acceleration.

- The load will clear all obstructions – Lift the load only high enough to clear the tallest obstruction in the travel path. Always pre-plan and check the travel path to avoid personnel and obstructions.
- Use a tag line when loads must traverse long distances or must otherwise be controlled.
- Cranes will not be used for dragging loads sideways.
- Employees will never work under loads.
- The brakes will be tested prior to each lift when the weight approaches the maximum for the crane.
- Loads will not be lowered below the point where less than two (2) wraps of rope remain on their drums.
- Land the load when the move is finished. Operators, riggers, and spotters will pre-plan where the safe landing area will be prior to starting the lift and note on the THA/JHA.
- **Never** leave suspended loads unattended. In an emergency where the crane or hoist has become inoperative, if a load must be left suspended, barricade and post signs in the surrounding area, under the load, and on all four sides. Lock open and tag the crane or hoist's main electrical disconnect switch.

Operating Near Electric Power Lines

Cranes shall be operated near, under, over, or by power lines only in accordance with the following:

- For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet.
- For lines rated over 50 kV minimum, clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kV over 50 kV, or use twice the length of the line insulator but never less than 10 feet.
- In transit with no load and boom lowered, the clearance shall be a minimum of 4 feet.
- It is recommended that a person be designated to observe the clearance and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.
- Before the commencement of operations near electrical lines, the Manager of Plant Support and Safety will notify the owners of the power lines or their representative, providing them with all information about the specific job and requesting their cooperation.
- Any overhead wire shall be considered to be energized unless the owner or the electrical utility representative gives positive indication that the line is not energized.

Parking a Crane

- Remove all rigging from the hook. Return the rigging device(s) to the designated storage/staging area.
- Raise the hook at least 2.1m (7 feet) above the ground/floor.
- If applicable store the pendant away from work areas, or raise it at least 7 feet above the ground/floor.
- Place the emergency stop switch (or push button) in the off position.

Working at Heights on Cranes

Anyone conducting maintenance or repair on cranes at heights greater than 4 feet shall use fall protection. Fall protection includes safety harnesses that are fitted with a lifeline and securely attached to a structural member of the crane or building or properly secured safety nets.

Hazards Common to Cranes

Power line Contact – Power line contact is the inadvertent contact of any metal part of a crane with a high-voltage power line.

- Most power line contacts occur when a crane is moving materials adjacent to or under energized power lines and the hoist line or boom touches a power line. Contact also frequently occurs during pick-and-carry operations when loads are being transported under energized power lines. Sometimes the person who is electrocuted is touching the crane or getting on or off of it when the hoist line or boom inadvertently comes into contact with an energized power line.
- The best hazard prevention method to avoid such an occurrence is to position the crane to keep a 10-foot clearance so the boom or hoist line cannot reach the power lines.
- Power line contact usually occurs because no one considered the need for specific hazard prevention measure to avoid using cranes near power lines. The key to avoiding power line contact is prejob safety planning. Planning is one of the greatest accident deterrents available in the workplace.
- A single individual should have overall supervision and coordination of the project and must initiate a positive direction to assure that pre-job safety planning is done before any cranes arrive at the worksite.
- It is extremely difficult for a crane operator to:
 - Judge accurately clearances between a crane and power lines simply through the use of vision.
 - See more than one visual target at a time.
 - Overcome the camouflaging characteristics that trees, buildings, and other objects have upon power lines.
 - Sometimes a crane operator cannot judge the clearance of the boom from the power line because the boom blocks the operator's view to the right. Sole reliance upon the performance of crane operators, riggers, and signalers, without any planning to separate cranes from power lines, has resulted in many deaths.

Overloading

Occurs when the rated capacity of a crane is exceeded while a load is being lifted and maneuvered, resulting in upset or structural failure. Overloading also occurs when poorly trained personnel are allowed to operate cranes. The operator must always know the weight of the load, if the weight of the load is not known, operations shall be stopped until it can be determined.

- Cranes or hoists shall not be loaded beyond their rated capacity for normal operations.
 - An operator is not permitted to make a lift without knowing the weight of their load. Failure to comply with this rule will result in immediate suspension of duties and an investigation by the Safety Department in conjunction with the Division Manager.
 - Any crane or hoist suspected of having been overloaded shall be removed from service by locking open and tagging the main disconnect switch.
 - The **TEI Fleet Manager is to be contacted immediately** of any instances of Overloading. No operations shall proceed except under the direct supervision of the TEI Fleet Manager.
 - **Only the TEI Fleet Manager may return a piece of equipment** to operation after suspected, or confirmed, overloading.

Obstruction of Vision

The safe use of a crane is compromised when the vision of an operator, rigger, oiler, or signaler is blocked and employees cannot see what the others are doing. There are two general categories for obstructions to the crane operators' vision:

- Obstruction by the crane's own bulk;
- Obstruction by the work environment.

- The crane size alone limits the operator's range of vision and creates many blind spots, preventing the rigger, signaler, oiler, and others affected by the crane's movement from having direct eye contact with the crane operator.
- To overcome the hazards of blind spots while loads are being lifted cell phones and/or radios will be the preferred method of communication, as opposed to signalers. The means of communication must be listed in the THA/JHA/Lift Plan, etc.
- Automatic travel alarms will be utilized as an effective means of warning those in the immediate vicinity of crane travel movement in pick-and-carry functions.

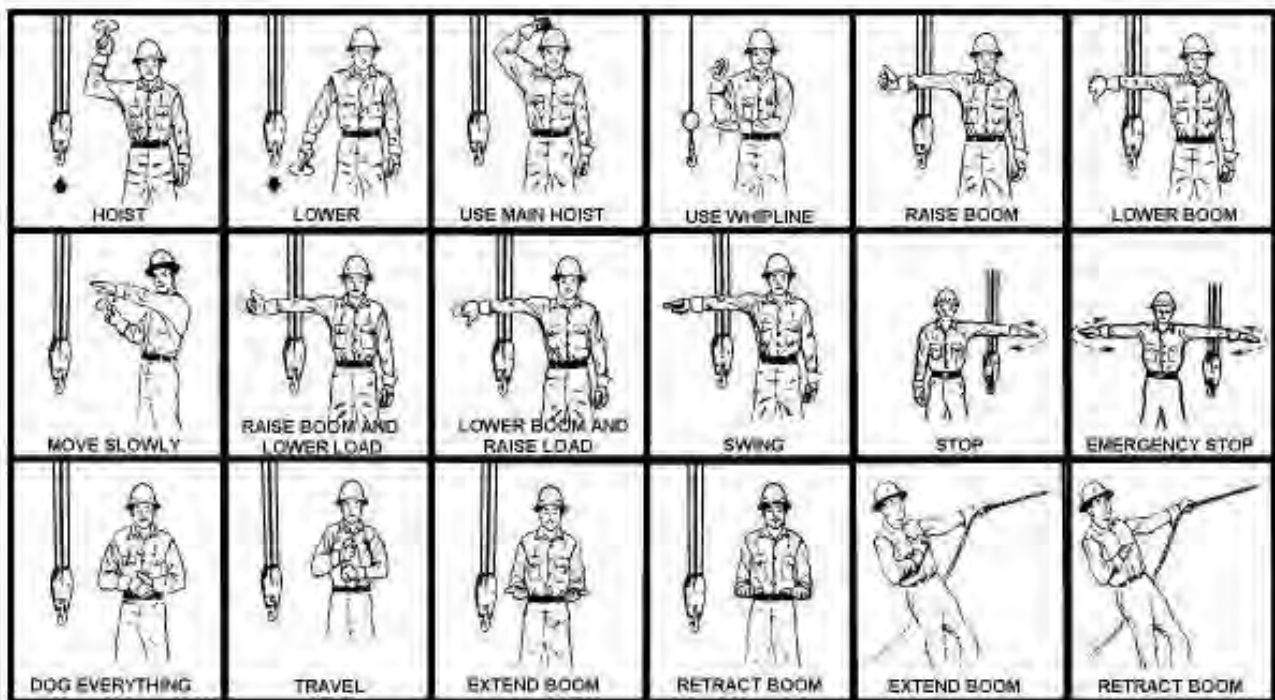
Communication

Standard signals to the operator shall be in accordance with the most current ANSI Standard, unless voice communication equipment (cell phone, radio, or equivalent) is used. Signals shall be discernible or audible at all times. No response by anyone involved in the lift shall be made unless signals are clearly understood.

- Hand signals shall be in accordance with this policy and shall be posted conspicuously.
- Special signals shall be agreed on in advance by the operator and the signal person and should not be in conflict with standard signals. These special signals are for operations not covered by the hand signals or for special conditions that occur from time to time.
- If it is necessary to give instructions to the operator other than provided by the established signal system, the crane motions shall be stopped.
- Modes of communication must be agreed upon in the pre-task planning, as well as during the lift plan and relevant JHA/THA.

Basic Crane Hand Signals for Mobile Cranes

Individuals responsible for directing crane and hoist operators during lifting operations shall use standard hand signals. These signals shall be conspicuously displayed in work areas to ensure proper use.



Signal Person Qualifications (reference ASME B30 series). Prior to signaling crane operations, all signal persons shall be tested by a designated person and demonstrate their qualifications (at a minimum) in the following areas:

- a) Basic understanding of crane operation and limitations.
- b) Standard hand signals whenever hand signals are used.
- c) Standard voice signal procedures whenever voice signals are used.

Standard Voice Signals. Prior to beginning lifting operations using voice signals, the signals shall be discussed and agreed upon by the person directing the lifting operations, the crane operator and the appointed signal person.

- a) Cellphones, radios, or equivalent shall be tested before lifting operations begin.
- b) Prior to commencing a lift, the operator and signal person shall contact and identify each other.
- c) All directions given to the crane operator by the signal person shall be given from the operator's direction perspective (i.e., swing right).
- d) Each series of voice signals shall contain three elements conveyed in the following order:
 - 1. Function, direction
 - 2. Distance and/or speed
 - 3. Function stop
- e) For lifting operations using voice signals, the person directing lifting operations shall consider the complexity of the lift, the capabilities of the particular crane, the experience and skill of the operator and signal person, and the ability to communicate the necessary signals before permitting multiple simultaneous crane function signals.

Tag Lines

- Loads shall be secured, balanced, and controlled with proper slings. The use of tag lines to keep the load stabilized shall be required whenever load swinging is anticipated.
- Wind and other weather conditions can adversely affect the lifting of loads. Tag lines are to be used in adverse weather conditions to prevent the turning and/or swinging of a load.
 - Outdoor hoisting operations should not start if winds are above 20 knots steady state or if gusts exceed 25 knots.
- Appropriate ANSI approved Personal Protective Equipment will be worn by any personnel operating a tag line, this includes, but is not limited to:
 - Class A Hard Hat
 - Safety Glasses w/ Side Shields
 - Ear Protection (Refer to JHA)
 - Reflective Vest
- The Operator and designated Signal-Person shall complete "Pre-Lift" meeting and advise all personnel involved in the operation of the signals to be utilized, lift path and ultimate destination. All personnel, other than those involved in the operation of tag lines and/or the lift will be removed from this lift path.
- Housekeeping procedures will be performed prior to the lift (along the lift path) to ensure that no tag line personnel will encounter any hazards (i.e., tripping hazard, unauthorized use of mobile equipment in the lift path, etc.).
- An authorized crane operator shall be at the crane controls at all times while a load is suspended.

Suspended Personnel Platforms

No suspended Personnel Platforms may be utilized at Thompson Electric without an approved Critical Lift Plan in place. Reference TEI's SWI #11 for guidelines and related forms

1. Ensure that daily crane inspection has been performed prior to lifting personnel.
2. Lift only under controlled conditions and with an appointed signalman.
3. A pre-lift meeting must be held, and attended by the operator, signalman, platform personnel, General Superintendent and all relevant site Supervisory Personnel.
4. Perform a test lift of the unoccupied platform with anticipated weight and lift it to each level; the test lift shall be made immediately prior to placing personnel on the platform and it must remain under 50% of the crane's rated capacity.
5. The platform and rigging shall be load tested to 125% of the platform's rated capacity and held suspended for a period of five (5) minutes.
6. A visual inspection of the platform must be conducted by a "Competent Person" after the trial lift.
7. A trial lift must be performed each time the crane is moved.
8. Personnel in the platform must wear an approved safety harness with lanyard.
9. The operator must remain seated at the controls when the platform is occupied.
10. "Traveling" the crane, with personnel in the platform is prohibited.
11. Personnel in the platform must remain in continuous sight or communication with the operator or signalman.
12. Cranes with outriggers must have them fully extended and blocked.
13. No platform lifts in winds above 15 mph, electrical storms, snow, sleet, or other adverse weather conditions.
14. After positioning the platform, all brakes and locks on the crane shall be set.
15. All cranes must be equipped with the following when lifting personnel:
 - An anti-two block (ATB) device, or a two-block damage preventative feature.
 - A boom angle indicator.
 - A boom length indicator.
 - Must also be equipped with a device to control load lowering (no free fall permitted).
16. The rigging selected for personnel hoisting must not be used for any other purpose and should be kept apart from other rigging or clearly identified in some way.

Rigging

Training

- Employees who use slings will be trained in:
 - Types of slings.
 - Applications and limitations of the various types of slings.
 - Inspection procedures for slings.
 - Removal of slings from service.
- Employees will be trained upon initial employment or upon new job assignment. Subsequent training will be determined by the Division Manager in conjunction with the Project Manager. All training will be documented.

General Rigging Safety Requirements

- All rigging equipment shall be inspected at a minimum annually by a Competent Person
 - Defective equipment is to be red tagged, immediately removed from service, and destroyed to prevent inadvertent reuse.
 - The annual sling audit will be performed by a Competent Person in conjunction with the Warehouse Manager utilizing the TEI Sling Tier 1 Audit Checklist.
- Load capacity limits shall be stamped or affixed to all rigging components. If the load capacity limit is not clearly visible and/or attached to the sling or choker the rigging device must be red tagged, immediately removed from service and destroyed to prevent inadvertent reuse.

Rigging a Load

- Complete the TEI Standard Lift Load Calculations Work Sheet.
- Determine the weight of the load. **Do not guess.** Rigging equipment shall not be loaded in excess of its manufacturer recommended safe working load,
- Determine the proper size for slings and components.
- Do not use manila rope for rigging.
- Make sure that shackle pins and shouldered eye bolts are installed in accordance with the manufacturer's recommendations.
- Safety hooks will be required with sure lock hooks or hooks with a heavy duty safety latch thus eliminating hook throat opening.
- Make sure that ordinary (shoulder-less) eye bolts are threaded in at least 1.5 times the bolt diameter.
- Use safety hoist rings (swivel eyes) as preferred substitute for eye bolts wherever possible.
- Pad sharp edges to protect slings. Remember that machinery foundations or angle-iron edges may not feel sharp to the touch but could cut into rigging when under several tons of load. Wood, tire rubber, or other pliable materials may be suitable for padding.
- Do not use slings, eye bolts, shackles, or hooks that have been cut, welded, or brazed.
- Install wire rope clips with the base only on the live end and the U-bolt only on the dead end. Follow the manufacturer's recommendations for the spacing for each specific wire size.
- Determine the center of gravity and balance the load before moving it.
- Initially lift the load only a few inches to test the rigging and balance.
- When the work is completed store all rigging equipment in the designated storage area away from the immediate work area.

Sling Inspections

- Slings will be inspected each day prior to use. Any visual defect will be reported. Damaged slings will not be used. In severe conditions (i.e., temperature, corrosion, etc.), slings will be inspected frequently throughout the day by a Competent Person.
- Alloy chain slings will be inspected every six months by a Competent Person or designated Qualified Employee for wear and defects in composition and welds. This inspection will consider not only the physical aspects, but also the total service life of the chain slings. This inspection will be recorded and maintained on file with the date of the inspection and name and signature of the employee performing the inspection.

Safe Sling Operation

The following procedures will be followed when using Slings:

- Slings damaged or defective will be tagged and removed from service immediately.
- Slings will not be shortened with knots or bolts or other makeshift devices.
- Sling legs will not be kinked.
- Slings will not be loaded beyond their rated capacity.
- Slings used in a basket hitch will have the loads balanced to prevent slippage.
- Slings will be securely attached to their loads.
- Slings will be padded or protected from the sharp edges of loads (i.e., utilization of softener devices).
- All employees will be kept clear of loads about to be lifted and of suspended loads.
- Hands or fingers will be kept clear of loads and not placed between the load and the strap.
- Shock loading will not be allowed.
- Slings will not be removed while loads are resting on the sling.

Pre-Use Rigging Inspection Repair, Storage & Removal from Service

- Rigging equipment for material handling shall be inspected by a Competent or Qualified Person prior to use and on each shift and as necessary during its use to ensure that it is in safe operating condition.
- Repair – Slings must be in good condition and not damaged or defective to ensure safe and reliable use. If slings are worn, damaged or defective they shall not be used. If the slings are believed to be repairable, then those slings will be returned to the sling manufacturer for repairs. The manufacturer must proof-test all repaired slings before they are accepted for reuse.
 - Under no circumstances will employees attempt to repair slings for reuse.
 - Broken links or attachments on steel alloy chain slings will not be repaired using mechanical coupling links.
- Removal from Service – If slings are damaged or defective, they shall not be used. All defective or damaged slings will be tagged immediately and removed from service.
 - The tagged slings shall be inspected by a Competent Person to determine if repairable. Slings that are not repairable shall be promptly destroyed by the Competent Person and the Warehouse Manager contacted with the serial number so that the rigging can be removed from inventory.
 - The following are conditions that will require a sling to be red tagged and removed from service.

Wire Rope Slings	▪ Ten randomly distributed broken wires in one rope lay or five broken wires in one strand in one rope lay. ▪ Wear or scraping on one-third the original diameter of outside individual wires. ▪ Kinking, crushing, bird caging or any other damage resulting in distortion of the wire rope structure. ▪ Evidence of heat damage. ▪ Hooks opened more than 15% of the normal throat opening measured at the narrowest point or twisted more than 10 degrees from the plane of the unbent hook. ▪ Corrosion of the rope or end attachments.
Natural & Synthetic Fiber Rope Slings	▪ Abnormal wear. ▪ Powdered fiber between strands. ▪ Broken or cut fibers. ▪ Variations in the size or roundness of strands. ▪ Discoloration of hardware in the sling.

Synthetic Web Slings	▪ Acid or caustic burns. ▪ Melting or charring or any part of the sling surface. ▪ Snags, punctures, tears, or cuts. ▪ Broken or worn stitches. ▪ Distortion of fittings.

Attachments

- All attachments including hooks, rings, oblong links, pear shaped links, and welded link components will be rated at the capacity of the sling itself.
- Makeshift links or other shop fabricated attachments will not be used.
- Slings twisted more than 10 degrees (10°), from the plane of the unbent hook, will not be used.

Softener Use Guideline (i.e., sling protection from sharp edges)

When do we need to use softeners?

- Anytime an edge could come in contact with a sling or a load handling and control device (i.e., chain falls, load chains, nylon and cables, etc.).
- Whenever there is a chance that a load will shift or slide in the slings.

Tips for making sure softeners are used consistently:

- Make sure that there are enough softeners of the right material on each work site.
- Make sure that the softeners are secure in place when the load is lifted.
- Ensure that the softeners are picked up and put away with the rest of the rigging materials.
- Train employees to use softeners with all rigging materials – nylon, chains and cable slings.
- Include the type and number of softeners needed in your Job Hazard Analysis (JHA) or pre-lift plan.

Types of softeners that can be used:

- Sliding sleeve covers that go over the end of the nylon slings.
- Velcro closure sling covers that allow it to be put on before or after the slings are in place on the load.
- Nylon slings can have softeners sewn in them by the manufacturer.
- Sling protectors that have magnets that attaches them to steel for use with cable and nylon slings.
- Wood can be a very good softener for steel when using cable and chain slings.
- Fire hose works well with nylon slings and can be cut to the length needed and slid over slings.
- Split round steel pipe on steel edges.

Benefits of softener use:

- Prevents accidents that could injure you or your co-workers.
- Stops damage to the slings and load.
- Softeners cut down on job costs by not having to replace damaged slings through misuse.

Wire Rope and Wire Rope Sling Inspections

The following information is to be used as a general guide for inspecting wire rope and wire rope slings.

- **Inspection frequency** will be based on safety factors, property damage, and the cost of replacing destroyed or damaged goods and material dropped due to the use or misuse of improper or damaged wire rope and slings. Additionally, slings should be inspected at regular intervals. This interval should be determined by the user and is dependent upon the particular use of the sling and Thompson's safety requirements (which may be stricter based on the work site and scope of work).

- A sling should be inspected after any unusual situation that may have damaged it, such as overload, accident, or fire. It should not be returned in service until continued safe operation has been verified.
- Each sling should have a serial number. If no number is available, a tag should be attached at the time of inspection. This number should be listed on the inspection report.
- Inspection should be performed only by persons with sufficient experience and knowledge to properly apply the criteria for rejection.
- The following should be considered criteria for rejection:

Randomly Distributed Broken Wires in One Rope Lay:	There should be no more than 10 broken wires in one lay for the entire length of the sling.
Broken Wires in One Strand of One Rope Lay	There should be no more than five broken wires in any one strand (single wire) of any one rope lay.
Abrasion	There should be no wearing, scrubbing, or preening of any outside wire causing the reduction of the diameter of a single wire by more than 1/3.
Kinking and/or Crushing	There should be no kinking, crushing, or other damage that results in detrimental distortion of the rope structure.
Bird Caging	There should be no opening or unlaying of the rope lays nor should the fiber core of the rope be exposed.
Heat Damage	There should be no evidence of heat damage including bare electrical conductor, grounding, or welding arc.
Corrosion	There should be no evidence of pitting or heavy coating of rust due to corrosion.
Reduced Diameter	There should not be any reduction of the diameter of the roped along the main length or of any section (overloading or contact with sharp edges of load without permission).
End Attachments	There should be no evidence of cracks, deformity, excessive corrosion, or excessive wear of the fittings forming the splice or socket
Hooks and Rings	Check for throat opening (no more than 15% stretch), twist (no more than 10%), cracks (none), and corrosion

Sorting /Pelican Hook Guidelines



Sorting hooks are designed to sort materials – commonly flat plates, sheet piles, straight beams and round pipes in a lay down area. Other uses include off-loading trucks and rolling structural shapes. The intent is to have the loads engaged fully into the throat of the hook. The following are guidelines for the safe use of the hooks on our project sites:

- Know the weight of the load and the capacity of the rigging – including the hook. The hooks that we use are normally rated for 7.5 tons in the throat of the hook.
- There is also an allowance for loading the hook further towards the tip. If the load is not engaged into the throat of the hook the load limit is reduced to 2 tons, however the load cannot be closer than 2" from the hook tip.
- Hooks must be attached to the load in a manner that maintains a level, balanced and stable condition throughout the sequence of the lift.
- If the load begins to bend, then stop the pick and evaluate the process further. Change the configuration if necessary.
- Use only wire rope slings for attachment to the hook if sling contacts load.
- If using sorting hooks with synthetic slings, add extra shackles at hooks so sling doesn't contact load.
- The loads must be in full view of the operator at all times during the pick.
- The load will be maintained as close to the ground as possible at all times.
- Materials shall not be lifted over head with sorting hooks. A positive connection must be used – i.e. a latching hook, choked slings, etc. for items being lifted overhead.
- Tension must be maintained at all times during the lift so that the hooks do not disengage.
- The sling angles shall not be greater than 45° from horizontal to maintain the allowable 7.5-ton hook capacity. At angles greater than 45° the force attempts to tip load and spread the hook. If the angle is greater than 45° then the capacity is reduced to 2 tons provided the limitations in item #2 are also met.
- Side loading of the hooks will not be allowed.
- Off-loading trucks with sorting hooks will be permitted.
- Employees will not be allowed in potential pinch points during the pick.
- Sorting hooks shall not be used for any purpose that exceeds the manufacturer's recommendations.
- Sorting hooks shall not be used for erecting steel.
- Sorting hooks shall not be used in choker hitch applications.



Sling/Rigging Program Tier 1 Audit
Checklist

Warehouse or Location/Job Site: _____

Audit Date: _____

Competent Person: _____

Warehouse Mgr./Supv. _____

Regulation Requirement	Question	Yes/No	Finding(s)	Recommendation	Responsible Person	Due Date	Date Closed
1910.184(d)	Have the users of slings been trained as a competent person to properly conduct the daily inspection?						
1910.184(d)	Do training records accurately reflect the certification of training?						
1910.184(d)	Are slings, fastenings, and attachments inspected for damage or defects by a competent person each day before being used?						
1910.184(d)	Are warehouse employees trained, knowledgeable, and competent in conducting the periodic sling inspections?						
1910.184(d)	Does TEI maintain an updated inventory of slings for periodic inspection scheduling and recordkeeping?						
1910.184(d)	Are the Inspection Checklists retained for one year per the Records Retention Policy?						
1910.184(d)	Are damaged or defective slings red tagged and immediately removed from service?						
1910.184(e)(1)	Do all alloy steel chain slings have permanently affixed durable identification stating size, grade, rated capacity, and reach?						
1910.184(e)(3)(i)	Is a thorough periodic inspection of alloy sling chains in use made on a regular basis (at least once every 12 months)?						
1910.184(e)(3)(ii)	Is a record maintained of the most recent month in which each alloy steel chain slings were thoroughly inspected?						
1910.184(g)(1)	Does each metal mesh sling have permanently affixed marking that states the rated capacity for vertical basket hitch and choker hitch loadings?						
1910.184(i)(1)	Are synthetic web slings marked to show the rated capacities for each type of hitch and type of synthetic web material?						

Additional Notes & Findings:



CRANE/LIFTING PROCEDURES

CRITICAL LIFT & STANDARD LIFT

Planning the Lift

Although all crane lifts require pre-lift planning to determine factors such as load weight, crane configuration, rated capacity, and site conditions, some lifts require more extensive planning by qualified persons and are often referred to as "critical lifts". Critical lifts require a more comprehensive lift plan to minimize the potential of equipment failure and/or catastrophic loss. To assist with this classification process Thompson Electric has developed Standard Work Instruction #11 for Cranes and Pre-Lift Planning.

Q: What Tools in addition to SWI #11 has Thompson given us to help with the process of Lift Classification?

A: Lift Evaluation Form - This form assists with determining total hoisted weight, environmental factors, soil /ground conditions, slope of ground which in turn helps us to decide if the lift equipment (i.e., crane, class VII PIT) will be under the 75% of rated capacity for a Standard Lift or over which would make it a Permitted or Critical Lift.

"As part of our goal to provide a safe and healthful workplace Thompson Electric has instituted these policies & procedures related to hazards associated with the use of Cranes, hoists & slings in the workplace."

Bill Boyd, Vice President of Operations, Thompson Electric, Inc.

Q: Once we determine the class of lift, where do we go from there?

A: 1st complete the Lift Evaluation Form to ensure that you have classified the Lift properly. If you have confirmed you are making a Standard or Permitted Lift complete the Standard Lift Job Safety Analysis, and the Standard Lift Load Calculation Worksheet. If you are making a Critical Lift contact your Superintendent for guidance on how to proceed. A Critical Lift is an in-depth process that will involve the Project Manager, Superintendent, Crane Operator, Rigger, Safety and possibly other parties. This type of Plan will be approved by Senior Management prior to implementation and must be on-site and reviewed prior to the Critical Lift being made. And every lift must have an accompanying Daily Task Hazard Analysis (revision #3 which is on the Public Folders under Safety Forms/THA) which will assist you also in addressing the Ground Conditions/Excavations and also other site hazards. The THA will help you ensure you have all the required processes and forms completed prior to making any lift.

Criteria For Defining a Lift

Always check with your Foreman or Project Manager, but below is a chart which can be used as a quick reference guide. Also review SWI #11 which can be found on the public folders. And You can also contact your site safety representative. (Note the below table is not all inclusive - Consult SWI #11 for additional guidance).



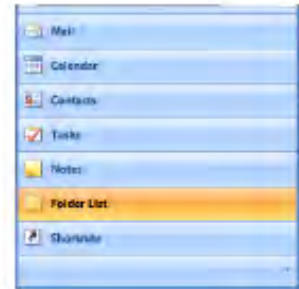
Standard Lift	Permitted Lift	Critical Lift
< 75% of the rated capacity	Lifts on unstable /unproven soil	Greater than 50,000 lbs.
≤ 4000 lbs lifted over live process equipment	Over 75% of rated capacity and ≤ 50,000 lbs. ,	≥ 1000 lbs. lifted over live process equipment
Does not require written "Lifting Plan" but does a "Lift Safety Analysis"	≥ 4000 lbs over live process equipment, occupied structures	Lift that encroaches on safe distance to uninsulated energized electrical lines

How To View Public Folders

At the bottom left of your Outlook(e-mail) screen you will see something that looks like the below images. The highlighted in each image shows the item to select for Public folders.



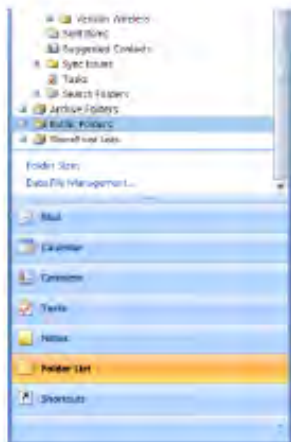
OR



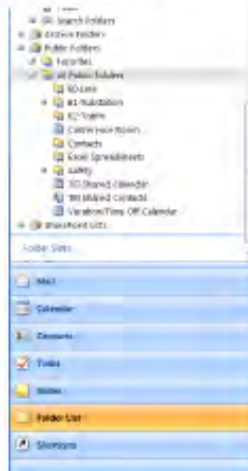
The pane on the left side of your Outlook will now have more items in the list. One of them being "Public Folders"

Expand the "Public folder" by clicking the + to the left of "Public Folders". Then Expand the "All Public Folders" in the same way.

Step #1



Step #2



- You will now see a list of all the Public files that are created.
- You can expand the folder by using the + button to the left of the folder.
- Once you have made your selection in the left pane you will see your selection in the center of your screen.

If you have any problems accessing the Public Folders or have additional questions, please contact Staci Haag for assistance. If you cannot reach Staci please contact Marilyn Wright or myself so we can forward you the forms or information

Additional Policies & Procedures that can be found in the Public Folders in Support of Lifting Procedures

Forms, Standard Work Instructions, Miscellaneous	Policies (Subject Specific)
• SWI #8 Task Hazard Analysis • Site Specific Safety Plan (if applicable) • Forms - Excavation & Soil Analysis • Forms - Task Hazard Analysis • ET&D MAD Flow Chart	• 2020-2021 Cranes & Slings (I.e., rigging) • 2020-2021 Trenching & Excavating • 2020-2021 Personal Protective Equipment • 2020-2021 Fall Protection or Walking, Working Surfaces • 2020-2021 Stop Work Authority

Any and all questions regarding equipment inspections, maintenance, repairs, or to report damage/ defects of any kind or severity are to be referred to our Fleet manager Barry Davis at 330-310-9952.

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Origination	Safety Div.	Vice President	N/A	08/01/12
01	Added inspection form & hand signal chart for overhead cranes (i.e., for Affected Divisions - Example would be Commercial & Inside Divisions)	Safety Div.	Vice President	12/28/12	01/31/13
02	Added "Softener" use guidelines	Safety Div.	Vice President	05/15/13	01/31/14
03	- Updated Introduction to include references to "Inspected" - Removed Vice President & allocated duties and responsibilities to Division & Project Managers - Clarified that Class VII Powered Industrial Truck Operators, Riggers, & Spotters fall under the guidance of this policy - Updated, & combined, some actions under "Moving Loads" - Under "Overloading" inserted language requiring the immediate notification of the TEI Fleet Manager & giving this individual total autonomy on post-overloading activities, including return to service - Under "Overloading" clarified that an operator may not make a lift until he/she knows the weight of their load - Outlined suspension of duties (for operators) & requirement for an investigation into any instances of making a lift without knowing the weight of the load - Retired "Variables That Affect Lifting Capacity" - General Rigging Safety Requirements – Warehouse Manager w/Competent Person will conduct annually the TEI Tier 1 Sling Audit using the included form - Retired the Overhead Crane & Hoist Inspection Form - Created & included Sling/Rigging Tier 1 Audit Form - Included a copy of TEI Toolbox Talk referencing TEI SWI #11	Safety Div.	Management w/Safety	09/2020	09/2020



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362

Electrical Safety

Electrical Hazard Awareness

TEI PROGRAM SAFETY-007 R3 20241115

Introduction

Thompson Electric, Inc.'s (*herein referred to as TEI*) Electrical Safety program is designed to prevent electrically related injuries and property damage. This program also provides for proper training of maintenance employees to ensure they have the requisite knowledge and understanding of electrical work practices and procedures. Only employees qualified in this program may conduct adjustment, repair or replacement of electrical components or equipment. This program provides the minimum requirements for TEI employees and is to be used in conjunction with other applicable TEI written programs, including but not limited to Arc Flash/NFPA 70E and Lockout/Tagout. TEI requirements outlined in this program may be superseded by more stringent customer or regulatory requirements as necessary. Any TEI subcontractors or tiered subcontractors must meet the requirements within this program. *References: NFPA 70E, Electrical Safety Requirements for Employee Workplaces, National Electrical Code (NEC) and OSHA Standard (Electrical Safety) 29 CFR 1910.331 through 1910.339.*

For purposes of this policy and its related procedures TEI recognizes the following definitions:

Qualified Worker – One who has received training in and has demonstrated skills and knowledge in the construction and operation of electric equipment and installations and the hazards involved.

- **Note:** An employee undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified person is considered to be a qualified person for the performance of those duties.

Unqualified – Employees who have not been trained or authorized by management to conduct electrical work and is required to maintain a distance of 10 feet from all electrical work.

Responsibilities

Division Managers & Project Managers

- Coordinating the training for qualified and unqualified employees.
- Conducting inspections and performing electrically related "Crew Based Safety Observations" to identify electrical safety deficiencies with their employees and on their job sites.
- Ensuring employees guard and correct all electrical deficiencies promptly.
- Ensure all new electrical installations on their job sites meet codes and regulations.

Employees:

- Report electrical deficiencies immediately to their immediate supervisors.
- Not work on electrical equipment unless authorized and trained.
- Properly inspect all electrical equipment prior to each use.
- Only "Qualified" employees may conduct repairs to electrical equipment

Working Under Overhead Lines

- If work is to be performed near overhead lines, the lines shall be de-energized and grounded, or other protective measures shall be provided before work is started.
- If the lines are to be de-energized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to de-energize and ground them.
- If protective measures, such as guarding, isolating, or insulating are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.
- Note: The work practices used by qualified persons installing insulating devices on overhead power transmission or distribution lines are covered by §1910.269 of this part, not by §§1910.332 through 1910.335 of this part. Under paragraph (c)(2) of this section, unqualified persons are prohibited from performing this type of work.

- **Unqualified Persons:** When an unqualified person is working in an elevated position near overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:
 - o (1) For voltages to ground 50kV or below—10 ft. (305 cm);
 - o (2) For voltages to ground over 50kV—10 ft. (305 cm) plus 4 in. (10 cm) for every 10kV over 50kV.
 - o (B) When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the distances given above.
 - o Note: For voltages normally encountered with overhead power lines, objects which do not have an insulating rating for the voltage involved are considered to be conductive.
- **Qualified Persons:** When a qualified person is working in the vicinity of overhead lines, whether in an elevated position or on the ground, the person may not approach or take any conductive object without an approved insulating handle closer to exposed energized parts than shown in Table S-5 unless:
 - o The person is insulated from the energized part (gloves, with sleeves if necessary, rated for the voltage involved are considered to be insulation of the person from the energized part on which work is performed), or;
 - o The energized part is insulated both from all other conductive objects at a different potential and from the person, or;
 - o The person is insulated from all conductive objects at a potential different from that of the energized part.
 - o **Table S-5**—Approach Distances for Qualified Employees—Alternating Current

Voltage range (phase to phase)	Minimum approach distance
300V and less	Avoid contact.
Over 300V, not over 750V	1 ft. 0 in. (30.5 cm).
Over 750V, not over 2kV	1 ft. 6 in. (46 cm).
Over 2kV, not over 15kV	2 ft. 0 in. (61 cm).
Over 15kV, not over 37kV	3 ft. 0 in. (91 cm).
Over 37kV, not over 87.5kV	3 ft. 6 in. (107 cm).
Over 87.5kV, not over 121kV	4 ft. 0 in. (122 cm).
Over 121kV, not over 140kV	4 ft. 6 in. (137 cm).

Vehicular & Mechanical Equipment Clearance Distances

Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a minimum clearance of 10 ft. (305 cm) is maintained. If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10kV over that voltage. However, under any of the following conditions, the clearance may be reduced:

- If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. (122 cm). If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10kV over that voltage.
- If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.
- If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in Table S-5 (page 4 – previous page).
- Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments, unless:
 - The employee is using protective equipment rated for the voltage; or
 - The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in the Qualified Person section of this policy (previous page).
- If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact.
 - o Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

Confined or Enclosed Work Spaces

- When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, the employer shall provide, and the employee shall use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts.
- Doors, hinged panels, and the like shall be secured to prevent their swinging into an employee and causing the employee to contact exposed energized parts.

Illumination

- Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely.
- Where lack of illumination or an obstruction precludes observation of the work to be performed, employees may not perform tasks near exposed energized parts. Employees may not reach blindly into areas which may contain energized parts.
- TEI requires a minimum of 10 foot-candles of illumination intensity for work in electrical equipment rooms and enclosed/confined spaces.

Electrical Equipment

- All electrical distribution panels, breakers, disconnects, switches, junction boxes shall be completely enclosed.
- Water tight enclosure shall be used where there is possibility of moisture entry either from operations or weather exposure.
- Electrical distribution area will be guarded against accidental damage by being located in specifically designed rooms or by use of substantial guard posts and rails and other structural means.
- Access to electrical distribution rooms is limited to those employees who have a need to enter.
- A clear approach and 3-foot side clearance shall be maintained for all distribution panels.
- All conduits shall be fully supported throughout their length. Non-electrical attachments to conduit are prohibited.
- All non-rigid cords shall be provided strain relief where necessary.
- Areas under new installation or repair will be sufficiently guarded with physical barriers and warning signs to prevent unauthorized entry.

Examination:

Electrical equipment shall be free from recognized hazards that are likely to cause death or serious physical harm to employees. The safety of equipment shall be determined using the following criteria:

- Suitability for installation and use in conformity with the provisions of this subpart. Suitability of equipment for an identified purpose may be evidenced by listing/labeling for that identified purpose.
- Mechanical strength and durability, including parts designed to enclose and protect other equipment, the adequacy of the protection thus provided.
- Electrical insulation.
- Heating effects under conditions of use.
- Arcing effects.
- Classification by type, size, voltage, current capacity, and specific use.
- Other factors which contribute to the practical safeguarding of employees using or likely to come in contact with the equipment.

Identification of Disconnecting Means and Circuits:

- All electrical control devices shall be properly labeled.
- Each disconnecting means for motors and appliances shall be legibly marked to indicate its purpose. Each service, feeder, and branch circuit, at its disconnecting means or overcurrent device, shall be legibly marked to indicate its purpose. These markings shall be of sufficient durability to withstand the environment involved.
- A disconnecting means is a switch that is used to disconnect the conductors of a circuit from the source of electric current. Disconnect switches are important because they enable a circuit to be opened, stopping the flow of electricity, and thus can effectively protect workers and equipment.
- Each disconnect switch or overcurrent device required for a service, feeder, or branch circuit must be clearly labeled to indicate the circuit's function, and the label or marking should be located at the point where the circuit originates. For example, on a panel that controls several motors or on a motor control center, each disconnect must be clearly marked to indicate the motor to which each circuit is connected.
- All labels and markings must be durable enough to withstand weather, chemicals, heat, corrosion, or any other environment to which they may be exposed.

Safe Work Practices for Electrical Equipment

- Safe work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts when work is performed near or on equipment or circuits which are or may be energized.
- Conductors and part of electrical equipment that have been deenergized but not been locked or tagged out shall be treated as live parts.
- Work on energized circuits is prohibited unless specifically authorized by Management.
- Any person working on electrical equipment at height must take necessary precautions to prevent a fall from reaction to electrical shock or other causes. A second person, knowledgeable as a safety watch, must assume the best possible position to assist the worker in case of an accident.
- Only Portable ladders with non-conductive side rails may be used on a TEI worksite.
- Conductive materials and equipment that are in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts. If an employee must handle long dimensional conductive objects (such as ducts and pipes) in areas with exposed live parts, the employer shall institute work practices (such as the use of insulation, guarding, and material handling techniques) which will minimize the hazard.
- De-energized parts are required to be locked and tagged unless exempted under §§1910.333(b)(2)(iii)(C) or 1910.333(b)(2)(iii)(E), as discussed below. If so exempted, either a lock or tag is required.
 - If a tag is used without a lock, it shall be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include the removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device.
 - A lock may be placed without a tag only under the following conditions:
 - Only one circuit or piece of equipment is de-energized, and
 - The lockout period does not extend beyond the work shift, and
 - Employees exposed to the hazards associated with reenergizing the circuit or equipment are familiar with this procedure.

Personal Protective Equipment

Employees working in areas where the potential contact with exposed electrical sources are present and likely, shall be provided (at no cost) and shall use Personal Protective Equipment (PPE). The following rules apply to the use and care of PPEs:

- Qualified employees will wear electrically rated safety shoes/boots.
- Conductive items of jewelry or clothing shall not be worn.
- PPE shall be used where contact with exposed electrical sources are present and likely.
- PPE shall be designed for the work being performed and environment in which it is used.
- PPE shall be visually inspected and/or tested before use. Any defective or damaged equipment shall be immediately replaced, repaired or discarded.
- In cases where the insulating capabilities of the PPEs may be damaged during the work, a protective outer cover, such as leather, must be used.
- Employees shall wear non-conductive head protection wherever there is a danger of injury from electrical burns or shock from contact with exposed energized parts.
- Employees shall wear protective eye/face equipment whenever there is a danger from electrical arcs or flashes or from flying objects resulting from an electrical explosion.
- Rated electrical insulated gloves shall be available for work on electrical equipment.

Electrical PPE Inspection Schedule (minimum requirements):

Type of Equipment	When to Test
Rubber Insulating Line Hose	Upon indication that insulating value is suspect.
Rubber Insulating Covers	Upon indication that insulating value is suspect.
Rubber Insulating Blankets	Before first issue and every 12 months.
Rubber Insulating Gloves	Before first issue and every 6 months.
Rubber insulating Sleeves	Before first issued and every 12 months.

- Only qualified persons may work on electric circuit parts or equipment that have not been deenergized. Such persons shall be made familiar with the use of special precautionary techniques, PPE, insulating and shielding materials and insulated tools.
- When working on or near exposed energized parts, Qualified Employees shall use insulated tools or handling equipment suitable for the voltage present and working environment. In cases where the insulation may be damaged, a protective outer layer should be employed.
- Fuse handling equipment, insulated for the circuit voltage, shall be used to remove or install fuses when the terminal is energized.
- Ropes and other hand lines used near exposed energized equipment shall be non-conductive.
- Non-conductive warnings and barricades shall be employed to alert Unqualified Employees of the present danger related to exposed energized parts.
 - Safety signs, warning tags, etc., must be used to warn Unqualified Employees of the electrical hazards present, even temporarily, that may endanger them.
 - Non-conductive barricades shall be used with safety signs to prevent Unqualified Employees access to exposed energized parts or areas.
 - Where barricades and warning signs do not provide adequate protection from electrical hazards, an Attendant shall be stationed to warn and protect Employees.

Portable Electrical Equipment (PEE) Safety Rules

Electrical equipment is defined as cord or plug-type electrical devices that include the use of flexible or extension cords. Examples of portable electrical equipment include power hand tools, powered bench tools, fans, radios, etc. The following safety rules apply to portable electrical equipment (PEE):

- The tool must be properly grounded or double-insulated.
- “Properly Grounded” means an approved three-wire cord with a three-prong plug. You should only use the tool in a three-pole outlet or receptacle.
- Never cut off or bend back the ground pin on a three-prong plug to make it fit in a two-pole receptacle. Never use a two-prong cheater or adapter.
- Make sure that the casing of a double-insulated tool is not cracked, split, or broken.
- If the tool is double-insulated, it will be labeled.

Double insulated symbol



- PEE shall be handled in such a manner so as to not cause damage. Power cords may not be stapled or otherwise hung in a way that may cause damage to the outer jacket or insulation.
- PEE shall be visually inspected for damage, wear, cracked or split outer jackets or insulation, etc., before use each shift.
- Always check the compatibility of cord sets and receptacles for proper use.
- Ground type cord sets may only be used with ground type receptacles when used with equipment requiring a ground type conductor.
- Attachment plugs and receptacle may not be altered or connected in a way that would prevent the proper continuity of the equipment grounding conductor. Adapters may not be used if they interrupt the continuity of the grounding conductor.
- Only portable electrical equipment that is double insulated or designed for use in wet areas or may be used.
- Employees that are wet or have wet hands may not handle PEE's (i.e., plug-in, un-plug, etc.). Personal Protective Equipment must be used when handling PEE's that are wet or covered with a conductive liquid.
- Locking-type connectors shall be properly secured after connection to a power source.

Electrical Circuit Safety Procedures

- Electrical power and lighting circuits are defined as devices specifically designed to connect, disconnect or reverse circuits under a power load condition. When these circuits are employed, the following rules apply:
- While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been deenergized, the circuits energizing the parts shall be locked out or tagged or both.
- Cable connectors (not of load-break type) fuses, terminal plugs or cable splice connectors may not be used, unless an emergency, to connect, disconnect or reverse in place of proper electrical circuits.
- After a protective circuit is disconnected or opened, it may not be connected or closed until it has been determined that the equipment and circuit can be safely energized.
- Overcurrent protectors of circuits or connected circuits may not be modified, even on a temporary basis, beyond the installation safety requirements.
- Only Qualified Employees may perform test on electrical circuits or equipment.
- Test equipment and all associated test leads, cables, power cords, probes and connectors shall be visually inspected for external damage before use. Any damage or defects shall be repaired before use or else the equipment will be tagged and removed from service.
- Test equipment shall be rated to meet or exceed the voltage being tested and fit for the environment for which it is being used.
- Where flammable or ignitable materials are stored, even occasionally, electrical equipment capable of igniting them may not be used unless measures are taken to prevent hazardous conditions from developing.
- Whether the tool is grounded or double-insulated, test it with a continuity tester or a GFCI before use.
- Inspect tool cords and extension cords daily for kinks, cuts, cracked or broken insulation, and makeshift repairs.
- Keep cords clear of the tool during use.
- Check extension cords and outlets with a circuit-tester before using them.
- Don't use the cord to lift, lower, or carry an electric tool. Don't disconnect the tool by yanking or jerking on the cord. You'll damage the cord, loosen connections, and run the risk of shocks and short-circuits.

- Protect tool cords and extension cords from traffic. Run them through conduit or if necessary, run cords overhead above work or travel areas.
- Report any shocks from tools or cords to your supervisor. Minor shocks can be a warning of fatal shocks later if tools and cords are not checked.
- Thompson Electric requires ground fault circuit interrupters to be used with all electrical tools regardless of location. GFCIs detect any current leaking to ground from a tool or cord and quickly cut off power before damage or injury can occur.
- When using single-to-multiple outlet adapters or converters they must be used with a GFCI device.

Extension Cords

- Extension cords shall be listed by the Underwriters' Laboratory (U.L.) and bear the U.L. label.
- Flexible extension cords shall be of the grounding type (three wires) and shall be constructed from type S, hard usage material. When cords are used with heating appliances, a type HS cord is required.
- Flexible extension cords shall not be used in excess of their rated capacity.
- Extension cords shall be used only in continuous lengths without splice or tap. Terminals and insulation shall be free of defects such as cracked, split or nicked insulation; exposed wires; knots; burn marks; loose connectors; or other damage that may present a fire or electrocution hazard. All extension cords showing defects shall be immediately turned over to the Site Foreman who will promptly destroy them.

Extension Cord Use and Maintenance:

- Extension cords shall not be used as a substitute for the fixed/permanent wiring on any Thompson Electric worksite.
- Extension cords shall not be tacked, stapled or otherwise affixed in semi-permanent or permanent manner.
- Multiple outlet adapters (octopus adapters) must be used with a GFCI device.
- Extension cords shall not be used on stationary equipment or equipment drawing more than 15 amps, such as power tools, refrigerators, television, etc.
- Extension cords shall not run through behind or in walls, ceilings or floors or other concealed space. Nor shall they be run in or through ventilation ducts.
- Extension cords shall not be placed under carpets, under doors, or other locations that subject the cord to abrasion or other damage and which would prevent adequate air circulation and cooling of the cord.
- Avoid creating a tripping hazard; do not place extension cords across walkways.
- Where hazardous atmospheres may exist, due to the presence of flammable gases or vapors or explosive dusts, extension cords shall not be used.
- The combined length of the appliance cord and extension cord that is used on very portable equipment, such as a floor sander, floor scrubber, hand tools, etc. shall not exceed 105 feet.
- Extension cords used outside, in bathrooms, kitchens, or in wet or damp areas shall be connected to a ground fault interrupter device or GFCI circuit only.
- Do not tie power cords in knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.

Training

Training for qualified and unqualified employees will provide an awareness and understanding of electrical hazards as well as providing an understanding of general electrical safety precautions.

Training shall include, but is not limited to:

- Employees who face a risk of electrical shock BUT ARE NOT QUALIFIED PERSONS shall be trained and familiar with electrically related practices.
- Employees will be trained in safety related work practices to prevent electrical shock.
- Clearance distances and the corresponding voltages to which the qualified person will be exposed.
- In order to prevent accidental electrical shock, Thompson Electric has established the following Electrical Safety Rules for Non-Qualified Workers
 - Do not conduct any repairs to electrical equipment.
 - Report all electrical deficiencies to your supervisor.
 - Do not operate equipment if you suspect any electrical problem(s).
 - Water and electricity do not mix.
 - Even low voltages can kill or injure you.
 - Do not use cords or plugs if the ground prong is missing.
 - Do not overload electrical receptacles.
- Additionally, training for Qualified Employees includes specific equipment procedures and requirements of OSHA 29 CFR 1910.331 to 1910.339 NEC & NFPA 70E

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Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Origination	Safety Div.	Vice President	N/A	09/2014
01	Removed Role of Vice President	Safety Div.	Safety Director	02/29/18	02/29/18
02	- Updated responsibilities for Division Mangers, Project Managers - Added poster for Overhead Power Line Safety - Added Minimum Illumination Intensities Table per OSHA 29 CFR 1926.56 - Added Toolbox Talk on Electrical Safety on the Work Site	Safety Div.	Vice President	05/15/13	01/31/14
03	- Removed redundant statements - Reorganized bullet points - All revisions listed on 2024 Written Program Updates – Electrical Safety	Safety Dept.	VP of Ops	11/12/24	11/13/24



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262

(330) 686-2300 F (330) 686-2362



Ergonomics
Backs & Soft Tissues

2020 - 2021

Introduction

Ergonomics is the study of people and their interaction with the elements of their job or task including equipment, tools, facilities, processes, and environment. It is a multidisciplinary field of study integrating industrial psychology, engineering, medicine, and design.

In a more practical sense, ergonomics is the science of human comfort. When aspects of the work or workplace exceed the body's capabilities, the result is often a musculoskeletal disorder (MSD). To help avoid MSDs, work demands should not exceed the physical capabilities of the worker. MSDs are also known by several other names including:

- CTDs (cumulative trauma disorders)
- RSIs (repetitive stress or repetitive strain injuries)
- RMIs (repetitive motion injuries)
- Overuse syndrome

The most common, recognizable name for MSDs is cumulative trauma disorders or CTDs. Whatever the name used, these injuries belong to a family or group of wear and tear illnesses that can affect muscles, nerves, tendons, ligaments, joints, cartilage, blood vessels or spinal discs of the body. MSDs do not include slips, trips and falls, cuts, motor vehicle accidents or other similar accidents; although a close look at the reasons for acute injuries often reveals design problems that can be corrected.

The purpose of our ergonomics program is to apply ergonomic principles to our workplace in an effort to reduce the number and severity of MSDs, thus decreasing workers' compensation claims and, where possible, increase productivity, quality, and efficiency. An ergonomically sound work environment maximizes employee comfort while minimizing the risk of undue physical stress.

Policy

It is the policy of Thompson Electric, Inc. (herein referred to as TEI) to provide all employees with a safe and healthy workplace. A proactive ergonomics program has been introduced into our company's written safety and health program.

TEI has also performed and published (with the assistance of Voc Works – Work Study specialists for CareWorks our Workers' Compensation TPA) Trade and Work Specific Job Descriptions which include Job Analysis Summary Sheets of Essential Job Functions, Frequency and Duration (available on the TEI Shared Drive under Safety).

- The guidelines for this portion of TEI's ergonomic program can found in the flow chart at the end of this policy (i.e., Upper Management Commitment).

This program is a collaborative effort that includes managers, supervisors, field employees and support staff. Management is responsible for the program's implementation, daily management, and meeting the safety departments recordkeeping requirements.

A proactive approach focuses on making changes when risks have already been identified, as well as incorporating ergonomics into the design phase of a new facility or process, into purchasing new equipment or tools, and into the contemplation of scheduling changes.

Remember these disorders affect the muscles, tendons, ligaments, joint cartilage, nerves, blood vessels, and spinal discs. So remember when assessing your work activities for your pre-job Task Hazard Analysis (THA), always ask yourself and your crew:

- How long is the duration of the exposure?
- How often is the frequency of the exposure?
- How much is the intensity of the exposure?

Prevention - Stretches

MSDs are preventable. Working smarter not harder, having basic knowledge about causes of these types of injuries are key to prevention. Early reporting of aches and pains can reverse or minimize soft tissue injury, with or without medical attention. Ergonomic safeguards can be put into action before the injury occurs, preventing the need for medical care in many cases. The longer a person works with an ache or pain, the longer it will take to recover.

Prevention is the key. Short breaks, stretching and sometimes just stopping to take a short in place break and a few deep breaths from the activity is an effective preventative measure. Frequent stretching is an important tool we tend to under use on our job sites. Stretches help prevent MSDs. Warming up before work is the best way to reduce the risk of these injuries. Cold joints, tendons and muscles are more likely to get strained by sudden movement or exertion.

We have included an example of pre-work stretches in the Appendix section of this policy. Laminated copies for use in your job trailers, THA book, etc. can be obtained from the Safety Department.

Remember the key benefits from pre-work stretches:

- Raises the heart rate (the body is prepared for physical exertion);
- Speeds up nerve impulses (reflexes are enhanced);
- Reduces muscle tension while reducing the risk of injury, particularly to connective tissue like tendons;
- Increases flexibility, joint mobility and sends oxygenated blood to the muscles groups.
- Stretches should be done at a minimum of once a day (preferably in the morning or the start of your work assignment)

And let's not forget job rotation. Keep in mind that effective job rotation of your crew members promotes the use of different muscle groups between repetitive job functions.

Prevention - Tools

To protect upper extremities, be sure the grips on all hand tools are not so large that it is difficult to grasp or too small that an employee must use their fingertips. Additional guidance to assist in SDSs from improper tool usage include:

- Ensure that sharp edges are covered with padding;
- Power demolition tools must be kept sharp and tuned up, so that the tool does the work and not the person holding it;
- Do not work overhead for extended periods of time. Have the employee utilize a ladder, scissor lift, aerial lift, scaffold, etc. to bring themselves up to the work.
- If they must do overhead work, schedule frequent breaks to allow the blood to flow back into their hands as the heart does not pump blood above shoulder level efficiently. Arms outstretched and elbows raised also place an employee at risk of injury. Frequent breaks and regular stretching are very important in these type of work situations.
- For vibration exposure; consider anti-vibratory gloves.

Training

Training is intended to enhance the ability of TEI Division Managers, Project Managers, Support Staff, Supervisors, and Employees to recognize work-related ergonomic risk factors and to understand and apply appropriate control strategies. Training in the recognition and control of ergonomic risk factors will be given as follows:

- To all new employees during orientation.
- To all employees assuming a new job assignment.
- When new jobs, tasks, tools, equipment, machinery, workstations, or processes are introduced.
- When high exposure levels to ergonomic risk factors have been identified.

The minimum for all TEI employees (regardless of status) will include the following elements:

- An explanation of TEI's ergonomics program and their role in support and enforcement of the program;
- A list of the exposures which have been associated with the development of MSDs;
- A description of MSD signs and symptoms and consequences of injuries caused by work and non-work-related risk factors;
- An emphasis on the importance of early reporting of MSD signs and symptoms and injuries to management, and;
- The methods used by (NAME OF COMPANY) to minimize work and non work-related risk factors.

Training will be provided in one, or a combination, of the following approved formats:

- Computer Based Training (interactive) program
- Oral presentations combined with instructional videos
- Distribution of educational literature
- Hands-on equipment and work practice demonstrations

All training will be documented with the name of the trainer, date of training, attendees, subject matter covered.

Trainers will be experienced in delivering training programs that address all work and non-work-related risk factors, and will be familiar with (NAME OF COMPANY) operations. Training will be provided from one, or a combination, of the sources listed below:

- Internally developed resources
- An outside consultant or specific equipment/product vendor representative
- All employees will be required to sign a training sign-in roster.

Responsibilities

Upper Management with assistance from Safety will:

- Ensure that all individuals performing worksite evaluations are properly trained;
- Ensure that control measures are implemented in a timely manner by Division Managers.
- Ensure that a system is in place for employees to report MSD signs or symptoms and suspected work-related risk factors to managers and supervisors;
- Ensure that accurate records are maintained and provide documentation upon request;
- Schedule manager, supervisor, and employee training and maintain records to include date, name of instructor, topic, and materials used, and;
- Monitor the program on a quarterly basis and provide an annual review.
- Follow-up with any ergonomics strategy and/or solutions.

Division Managers are responsible for:

- Ensuring that all individuals in their division performing worksite evaluations/THA's are properly trained.
- Accountability for the health and safety of all employees within their divisions through the active support of the TEI ergonomics program;
- Allocating human and/or financial resources;
- Attending ergonomics training to familiarize themselves with the elements of the program, recognition and control of work-related ergonomic risk factors, MSD signs and symptoms, TEI early reporting requirements and procedures, and medical management;
- Ensuring that all levels of their supervisors, project managers and employees have received the appropriate training;
- Ensuring that ergonomics practices and principles are considered when bidding work, conducting worksite evaluations, and;
- ensuring that recommended controls are implemented and/or used appropriately through active follow-up.

Supervisors and Project Managers are responsible for:

- Attending ergonomics training to familiarize themselves with the elements of TEI's program, recognition and control of work-related ergonomics risk factors, MSD signs and symptoms, early reporting requirements and procedures, and medical management.
- Ensuring that employees have received the appropriate training.
- Ensuring that employees are provided with and use the appropriate tools, equipment, parts, and materials in accordance with ergonomic requirements.
- Arranging for the immediate replacement of all damaged tools and equipment and enforcing TEI's Removal from Service (i.e., red tagging of damaged equipment/tools) policy.
- Ensuring that employees understand the MSD signs and symptoms and early reporting system;
- Responding promptly to employee reports.
- Seeking clarification from TEI's Human Resources representative, and the Safety Director, when return-to-work directives from the health care provider are unclear.
- Maintaining clear communication with Division Management, Human Resources, Safety, Field Supervision and Employees.

Every employee of TEI is responsible for conducting himself/herself in accordance with this policy and program. All employees will:

- Use the appropriate tools, equipment, parts, materials, and procedures in the manner established by Division Management, Project Managers, and Supervisors.
- Perform appropriate stretching exercises prior to the start of assigned work tasks.
- Ensure that equipment is properly maintained in good condition and when not, report it immediately;
 - Immediately report and red tag all equipment/tools that are damaged and making arrangements for an immediate replacement. No damaged equipment/tools are permitted to be used on TEI job sites/property.
- Provide feedback to Division Management, Project Managers, Supervisors and Safety regarding the effectiveness of design changes, new tools or equipment, or other interventions.
- Attend/complete ergonomics training as required and apply the knowledge and skills acquired to actual jobs, tasks, processes, and work activities.
- Report MSD signs or symptoms and work-related MSD hazards to the supervisor as early as possible to facilitate medical treatment and initiate proactive interventions.
- Take responsibility in their personal health and safety.

Risks

Construction is ranked as one of the highest "At Risk" industries when it comes to ergonomics because it involves working alone, work above the shoulders and below the knees. The factors that can contribute to soft tissue injuries are very complex and a checklist cannot cover all of the variables. However, the following are some key factors that should be eliminated or minimized as you perform your pre-job review/briefing (Task Hazard Analysis – THA):

- Working with a bent or flexed wrist
- Working with the neck bent at more than a 15 degree angle
- Hand tools that are not balanced as they are difficult to hold
- Hand tools with an overly large grip
- Hand tools with a trigger-grip span of more than 4 inches between the thumb and forefinger
- Hand tools with sharp edges or ridges

- Hand tools with direct air exhaust onto the hand
- Hand tools that do not meet the requirements of the task at hand
- Using body parts for “hammers” (hands, feet, etc.)
- Repetitive hand, arm and shoulder motions
- Arms and elbows held high or outstretched
- Controls, tools or materials beyond easy reach
- Controls that require too much force to operate easily
- Working with the body leaning forward
- Handling materials from heights above the shoulder or below the knee
- Handling large bulky material regardless of its weight
- Over excessive twisting or stretching
- Repetitive pushing or pulling, including requirements for high strength
- Standing or sitting for long periods of time
- Working in an immobile position for extended periods of time
- Static muscular work
- Lack of adjustable or poorly designed work surfaces and chairs
- Work space that doesn’t accommodate the smallest person for reach and the largest person for clearance
- Inadequate lighting and visibility
- Peak loads of muscular effort

Awkward Postures

Most injuries are caused by awkward body postures. The risk factors include: force, repetition, vibration, contact stress, posture, and the environment. The following are some of the most common tasks or exposures, on our work sites, that can produce soft tissue aches and pains:

- Repetitive load (i.e., materials) handling
- Handling loads that require awkward body postures, such as bending and reaching out to an object that cannot be held close to the body in an erect posture
- Handling excessively heavy and/or bulky, difficult-to-hold materials
- Twisting the torso to one side while lifting
- Repetitive or sustained bending over
- Handling demands beyond the capabilities of crew members assigned to the job
- Unprotected, prolonged use of vibrating tools and equipment
- Repetitive flexion (i.e., wrist bent inward toward palm), extension (i.e., wrist bent upward toward outer forearm) or deviation (wrist bent to the side in either direction) of the wrist, especially while exerting force or grasping an object
- Direct pressure on, or compression, of delicate parts of the hand or wrist
- Repetitive twisting hand motions or repetitive forceful hand work
- Poor body mechanics/positioning
- Exposure to cold temperatures, especially for prolonged periods of time

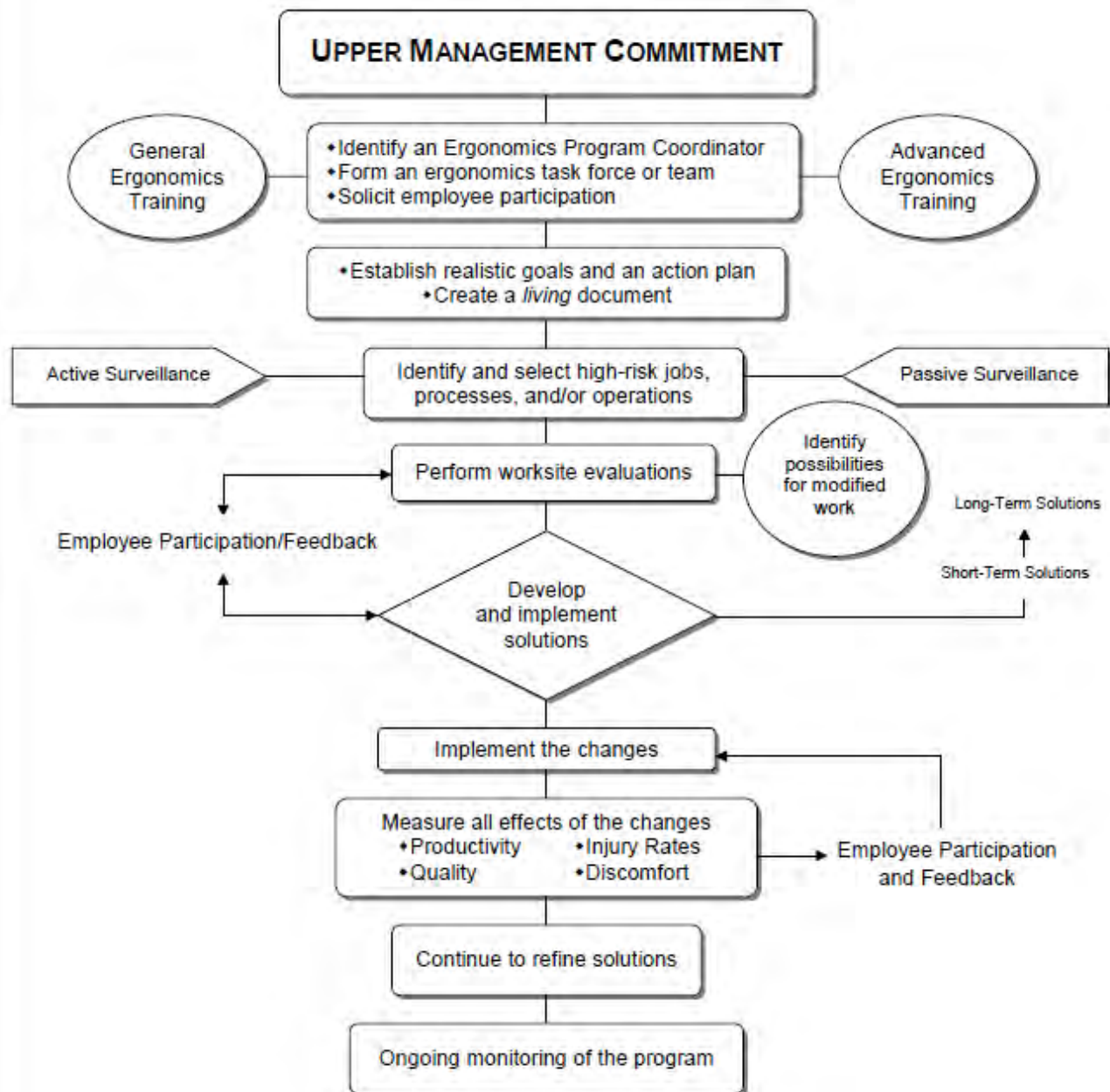
Lifting

Crew members will not lift over 50 pounds alone. If a load is too heavy to lift alone, seek additional help or utilize the many forms of mechanical means TEI had available for just such situations. TEI supplies lifting/force aids from come-a-longs, chain falls, to various classes of forklifts (with various attachments), wire carts, cranes, etc. Depending on the nature of the job. If we don't have it, ASK! Contact the warehouse manager or Safety for assistance in acquiring the proper lifting device/aid.

Proper lifting techniques are essential and are illustrated in the Appendix Section of this policy. Individual lifts over 50 pounds will require additional planning and approval by the Project Manager to evaluate materials and/or individuals capabilities.

Back pain injuries/illnesses can be prevented. Understand the limitations of the back and when planning your work take these precautions:

- Warm up before you lift. Bend or stretch gently to get ready.
- Use proper lifting techniques (see the Appendix section of this policy).
- Never twist at the waist, pivot from your feet.
- Push, rather than pull. It's much easier on the back. Brace your hands on the object, set your back in an extended position, then do all the pushing and moving with your legs.
- If you're lifting or working overhead, get closer to the object or the work you're doing.
- Get help. If you must lift something that feels heavy or awkward, ask someone to help, or get equipment to help. Use dollies, carts or mechanical assistance at all times.
- Take your time. Hurrying a task causes your muscles to act inappropriately, increasing the chance of injury.
- STRETCH. Maintaining any body position too long can be harmful. If you're sitting, kneeling or bent over for any length of time, stop frequently, stand and stretch your back, placing your hands just above your waist, against your back. If you're working in a standing position, or with arms overhead, stop frequently, squat and stretch.
- If you have an existing back problem, whether job related or not, inform your foreman/supervisor immediately.



JOB SITE STRETCHING EXERCISES.

Construction workers need to warm up to meet the job's physical demands. Simple stretching exercises will warm up muscles, improve elasticity and help keep you comfortable at work. Follow these general guidelines:

- **Breathe while exercising.** Don't hold your breath.
- **Exercise regularly.** Develop a pattern of exercising various parts of your body at regular intervals throughout your workday — before discomfort occurs. (See Sample Exercise Schedule at right.)
- **Stretch gently.** Avoid jerky movements.
- **Go easy at first.** Start with a few exercises and gradually increase.
- **Discontinue if pain occurs.** Pain and discomfort after you exercise may indicate that you did too much. Check with a medical professional when in doubt.

FIT EXERCISE INTO YOUR WORKDAY

Having a plan will help you remember to exercise. Here's a sample schedule that you can follow, or select your own combination of these exercises and adjust the schedule to fit your workday.

SAMPLE EXERCISE SCHEDULE

TIME	EXERCISE	MINUTES
Pre-shift or start of shift	• Neck • Shoulder circles • Arms, shoulders and rib cage "fencing"	4-5
Mid-point 1st half of shift	• Shoulders and arms • Shoulders, back and hips • Wrists	3-4
Mid-point 2nd half of shift	• Shoulder circles • Chest and shoulders • Knee stretch	3-4



NECK

- Start with your head facing forward.
- Turn your head slowly to one side as far as comfortable.
- Then turn to the other side.
- Repeat five times.



SHOULDER CIRCLES

- Slowly move your shoulders in a circular motion: upward, forward, downward and backward for forward circles.
- Reverse the direction for backward circles.
- Repeat five times each direction.



ARMS, SHOULDERS AND RIB CAGE

- Interlace your fingers.
- With your palms facing upward above your head, press your hands upward, stretching your arms. Hold for five seconds.
- Gently stretch to one side, hold for five seconds and return to center.
- Gently stretch to opposite side, hold for five seconds and return to center.
- Repeat five times.

VARIATION:

Press hands forward at shoulder level.



SHOULDERS AND ARMS

- Extend one arm at shoulder level across your chest.
- Place your opposite hand on your elbow and gently apply pressure toward the opposite shoulder, stretching your arm across your chest.
- Repeat, alternating sides.



CHEST AND SHOULDERS

- Bend your elbows with your hands near your shoulders.
- Breathe in through your nose. As you exhale, lower your elbows down and back. Aim your elbows at your back pockets.
- Hold this position for a few seconds and then relax.
- Repeat five times.

VARIATION:

Keep elbows at shoulder height.



SHOULDERS, BACK AND HIPS

- Place your palms on your lower back while in a standing position.
- Leaning your shoulders back, stretch your upper body backwards. Hold this position for five seconds.
- Return to a neutral position.
- Repeat five times.



WRISTS

- With your forearm in a comfortable horizontal position and your palm toward the floor, bend your wrist down.
- Then raise your hand, extending your wrist.
- Repeat five times.



"FENCING"

- In a standing position, place your hands against a stable object or wall to support yourself. Move one foot back about two feet. Be sure that both feet point forward.
- Shift your weight forward over the foot in front, bending the forward knee up to 80-90 degrees.
- Hold the position for 1-2 seconds and slowly return to the standing position, keeping the forward foot out in front.
- Repeat five times.
- Switch position with the opposite leg forward and repeat five times.



KNEE STRETCH

- In a standing position, support yourself by holding onto a stable object, like a wall or a table that is bolted to the floor.
- Bend your right knee, bringing your foot up toward the back of your thigh.
- Grasp your foot with your right hand, gently stretching your knee, moving your foot toward the back of your thigh.
- Slowly release your foot and return to the original standing position.
- Repeat, alternating legs, five times each leg.

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	• Origination	Safety Div.	Safety Director	N/A	08/2020
09/2020	• Integration of flow chart depicting Upper Management Commitment	N/A	Management w/Safety	09/2020	N09/2020



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362

Fall Protection

Walking/Working Surfaces

TEI PROGRAM SAFETY-009 R4 202411

Introduction

Thompson Electric, Inc. (herein referred to as TEI) performs a wide variety of tasks on a daily basis that require employees to face the challenges of working at heights. Slips, trips and falls are consistently one of, if not the, leading cause of injuries and fatalities in not only construction but the workplace in general. Fall protection is consistently one of, if not the, standards most commonly cited by OSHA. With those facts in mind, this program's purpose is to outline the TEI's minimum requirements to address the hazards of working at height as well as maintaining OSHA compliance to ensure the safety and health of its employees. The follow written program will address both fall protection requirements and the various walking/working surfaces upon which TEI's employees carry out their work.

This program is intended to address comprehensively the issues of:

- Identifying potential deficiencies;
- Evaluating the associated potential hazards;
- Communicating information concerning these identified hazards; and
- Establishing appropriate procedures, corrective measures and training for employees.

At TEI all employees, and the general public, must be protected from fall hazards and falling objects whenever:

- An affected employee is (4) four feet (General Industry) or (6) six feet (Construction Industry) or more above a lower level;
- When workers could fall into or onto dangerous equipment from any height;
- For Scaffold work at a minimum 10 feet or as marked by the Competent Person on the scaffold tag.

Unprotected falls from elevation usually result in debilitating injury or death. Falls from elevations can be prevented through the use of proper preparation and prevention systems. All work from elevated surfaces will be accomplished without any risk of falling to a lower level. This goal can be achieved by:

- Removing the hazard: avoid working at heights. When possible bring the work down to the ground level.
- Substituting mobile elevated work platforms (MEWP) for accessing unprotected elevated working surfaces.
- If work at heights is unavoidable, secure the elevated work area with a passive fall prevention barrier system, such as guardrails.
- When a barrier system is not feasible because of the physical characteristics of the work environment or the infrequency of access, use an approved fall restraint system.
- If no other option is feasible, a properly engineered and approved Personal Fall Arrest System (PFAS) can be used in conjunction with a rescue plan.

Scope

This fall protection written program and its requirements apply to all employees who access elevated work areas (over 4 feet, 6 feet or 10 feet as applicable). Fall protection shall be addressed on each Job Hazard Analysis.

- Fall protection relating to ladders, scaffold usage, MEWPs, excavations, motor vehicles or personnel hoists are not addressed in this policy. Please refer to their individual sections and/or policies for their specific fall protection requirements.

The requirements of this policy address many situations at Thompson Electric where personnel work at elevated locations, including, but not limited to:

- Accessing or working from unprotected elevated work locations such as the top of tanks, transformers, etc.
- Accessing roof-mounted equipment such as HVAC units, silos, etc.
- Pulling in hoisted equipment at elevated levels.
- Installing or repairing elevated electrical conduit, lighting fixtures, and exhaust ductwork.

Definitions of Selected Terms

Anchorage Point – A secure point of attachment for workers' lifelines, lanyards, or deceleration devices. Anchors must be capable of supporting a minimum load of 5,000 pounds per worker or 2x the maximum arresting force.

Authorized Person – A person at Thompson Electric who has successfully completed required training and is also authorized to wear and use fall protection equipment.

Body Harness – Straps that an individual wear to distribute fall-arresting forces over the thighs, waist, chest, shoulders, and pelvis. Attaches to other components of a personal fall-arrest system.

Competent Person – One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. A designated Thompson Electric Competent Person has completed required training and has appropriate experience.

Construction Work – Any activity involving the construction, alteration, painting, repairing, construction maintenance, renovation, removal, or wrecking of any fixed structure or its parts.

Controlled-Access Zone (CAZ) – An area in which certain work may take place without fall protection and access is controlled.

Conventional Fall Protection – A guardrail system, safety-net system, or personal fall protection system.

Cover – A rigid object used to overlay openings in floors, roofs, and other walking and working surfaces.

Elevated Surface Work Plan (ESWP) – A document which examines and addresses fall hazards associated with a particular job on an unprotected elevated work platform or area. Incorporates elements of a rescue plan if fall arrest systems are in use.

Fall-Protection Plan – Enables workers doing *leading-edge work or residential-type construction* work to use alternative fall-protection systems or methods when conventional fall-protection systems are not practical or that they add to worker risk.

Fall Restraint System – A fall-protection system designed to physically prevent a worker from free falling.

Free Fall – Falling before fall protection begins to arrest the fall.

Free Fall Distance – The vertical distance a worker falls before a personal fall-arrest system stops the fall; measured from the attachment point of the personal fall-arrest system immediately before and after the fall.

Guardrail System – Barriers erected to prevent workers from falling to a lower level.

Handrail – A single bar or pipe supported on brackets from a wall or partition, as on a stairway or ramp, to furnish persons with a handhold in case of tripping.

Hole – Gap or open space in a floor, roof, horizontal walking-working surface, or similar surface that is at least 2 inches (5 cm) in its least dimension.

Leading Edge – The edge of a floor, roof, formwork, or other walking and working surface that changes location as additional sections are placed. Leading edges not actively under construction are considered unprotected sides and edges.

Lifeline – A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Maintenance Work - Making or keeping a structure, fixture or foundation in proper condition in a routine, scheduled or anticipated fashion. Equipment reinstalled or replaced with identical equipment.

Mid Rail – A rail midway between the top rail and platform, secured to the uprights erected along the exposed sides and ends of platforms.

Non-Certified Anchor – Anchor that was not designed and tested to be a fall protection anchor but deemed to be acceptable to use as an anchor.

Opening – Gap or open space in a wall, partition, vertical WWS, or similar surface, at least 30 inches (76 cm) high and at least 18 inches (46 cm) wide, through which an employee can fall to a lower level.

Personal Fall-Arrest System – A conventional fall-protection system designed to stop a single worker from free falling to a lower level. Components include an anchor, connectors, and a body harness.

Platform – A working space for persons, elevated above the surrounding floor or ground; such as a balcony.

Qualified Person – A person who by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to resolve problems relating to a specific subject, operation, or project.

Roofing Work – Includes hoisting, storage, application, and removal of roofing materials and equipment.

Runway – Elevated walking-working surface, catwalk, or walkway between buildings.

Standard Strength & Construction – Any construction of railings, covers, or other guards that meets the requirements of 29 CFR 1910.23.

Stair Railing – A vertical barrier erected along exposed sides of a stairway to prevent falls of persons.

Toe Board - Low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls to personnel.

Walking & Working Surface (WWS) – Any surface (except on ladders, vehicles, or trailers) on which workers perform tasks or jobs.

Warning-Line System – A barrier erected on a roof to warn workers they are approaching an unprotected edge; designates an area for roofing work without conventional fall-protection systems (guardrail, safety net, or PFAS).

General Requirements for Fall Protection & Walking, Working Surfaces

Authorization

- Work in unprotected elevated areas requires identification of hazards and controls, documented in a site-specific fall protection plan also referred to as an Elevated Surface Work Plan (ESWP), generated and/or approved by a Competent Person.
 - Authorization through an ESWP shall be noted in the routine or non-routine Job Hazard Analysis document which shall reflect any fall hazard(s) regardless of severity.

Preferred Controls

PPE such as Personal Fall Arrest Systems shall be the last solutions considered to protect persons from falling from heights. The following Engineered controls will be used by Thompson Electric as its primary means of providing effective fall prevention:

- **Roofs** – Engineered guardrails designed in accordance with applicable standards or 39-inch height minimum parapets are required at roof edges when “frequent” access is required.
- **Other Elevated Work Surfaces** – Engineered guardrails designed in accordance with applicable standards are required on elevated fixed platforms, mezzanines, catwalks, and balconies when “frequent” access is required

For infrequent access at these locations or if guardrails are infeasible, fall protection equipment may be used in conjunction with an ESWP (and rescue plan if fall arrest systems are used).

For construction related activities exposing employees to unprotected heights over 6 feet, acceptable means to reduce fall hazards include:

- Bringing the work down to ground level.
- Using ladders properly, according to manufacturers' instructions and applicable regulations.
- Scaffolding.
- Using elevating work platforms and aerial devices.
- Using fall restraint, work positioning, and fall arrest systems only if other methods are infeasible.

In the event an employee falls, or some other related, serious incident occurs, (i.e., fall from elevated height, a near miss, or other than serious accident) Thompson Electric will investigate the circumstances of the fall or other incident to determine if the ESWP needs to be changed (i.e., new practices, procedures, or training) and shall implement those changes to prevent similar types of falls or incidents.

Procedures & Specific Requirements

Accessing Unprotected Elevated Work Locations

Prior to accessing an unprotected elevated work area, either

1. An established procedure must be in place and the Affected Personnel trained in it or
2. An Elevated Surface Work Plan must be developed and/or approved by a Competent Person, who will ensure the Affected Personnel understand all of its requirements.

Established Procedure

A well developed and approved procedure is an acceptable work authorization, precluding the need for individual work authorization. Such procedures must be developed and implemented by a Competent Person.

Elevated Surface Work Plan (ESWP)

An ESWP must be developed and/or approved by a Competent Person, then approved by the company designated Safety Representative and building/area/facility Manager or designees, along with the specific associated work activities. This ESWP will address associated fall hazards and provide a rescue plan as required.

➤ Rescue Plan

- When fall arrest systems are in use, a Competent Person will develop an effective rescue plan specific to the work location and the job being performed prior to the commencement of work activity.
- The plan shall include means for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves.
- All Thompson Electric rescue plans shall be documented in the ESWP.
- Alternatively, the Competent Person must ensure employees are trained on and capable of self-rescue to a safe location when applicable.

➤ Fall Distance Calculation

- An Authorized Person who has been sufficiently trained in proper calculation methods, must perform the fall distance calculation to ensure the intended active conventional fall protection system will not allow a worker to free fall to a lower level or strike a hazard on a lower level.

- When using a fall arrest system, the fall distance calculation must account for the length of lanyard or free fall distance of SRD, any additional connecting hardware, deceleration distance, the height of the person wearing the equipment (or the height of the D-ring attached to the back of the harness), one foot of slack in the harness, the position of the anchorage point, and a safety factor of 1.5 feet.
- Depending on the above variables, the minimum height required for a fall arrest system to be effective in preventing contact with a lower level may be as much as 18 feet. Fall arrest systems should not be used at heights with less than 18 feet clearance to a lower level unless it can be proven by a Competent Person that the employee will not contact the lower level in a fall. Where vertical clearance is inadequate, another way to gain access to the elevated work location must be found (i.e., scissor lift or ladder).
- Fall arrest systems should not be used to protect personnel working near vertical drop-offs such as roof edges and hoist areas due to the potential from a swing impact injury, and the difficulty of rescue. Instead fall restraint systems should be used in these situations.

Fall Protection Monitor

- A system where a Competent Person (designated as the “Safety Monitor”) who has been chosen, approved and listed on the ESWP form by the Foreman, is responsible for recognizing fall hazards and warning employees when they appear to be unaware of a fall hazard or are acting in an unsafe manner.
- The Safety Monitor shall ensure the safety of other employees and has the following requirements:
 - Be on the same walking/working surface as the monitored employees and within visual unobstructed sighting distance of the monitored employees;
 - Be close enough to communicate orally with the monitored employees;
 - Be competent in recognizing fall hazards;
 - Shall not have other responsibilities which could the monitor’s attention from the monitoring function.
- Do not use mechanical equipment on low-sloped roofs where a Safety Monitoring System is the method of protection.
- The area in which work is being performed under the observation of a safety monitor is a controlled access zone (CAZ). The safety monitor shall only allow access to the employees they are monitoring. Any employee working in the CAZ shall comply promptly with fall hazard warnings from the safety monitor.

Fall Protection Plan (FPP)

When the use of conventional fall protection (guardrails, fall arrest or restraint equipment) is impractical or creates a greater hazard during construction activities, a fall protection plan (FPP) may be developed by a company Competent Person. FPP’s are only applicable to Residential work.

Transit from Ladders to Roof Surfaces

Until barriers or other effective methods of fall protection can be installed, transit to and from ladders at roof edges will be permitted when all of the following conditions exist:

- The roof being accessed is a low sloped roof (a maximum pitch of 4 vertical to 12 horizontal).
- There are no current adverse environmental conditions affecting ability to see or move safely over the roof (such as high wind, extreme heat or sun glare, heavy rain).

- Safe ladder usage:
 - A fixed ladder is used that has proper grab rails over the roof edge or parapet, conforms to regulations, has been inspected and labeled by a Competent Person, and is deemed safe for climbing; or
 - A portable straight ladder is used that has been set up on a stable base, is properly secured to prevent movement, and extends at least (3) three feet above the roof landing surface.
- Immediately upon reaching the roof, the employee immediately walks away from the edge to the location on the roof where the work is to be done.
- Neither the location of the work nor the work itself will require the person to approach within (6) six feet of the roof edge at any time except when accessing the ladder.
- To descend, the employee approaches the ladder at an angle perpendicular to the roof edge to maximize the distance from the edge during access.

Use of Fall Protection Equipment

When an elevated work location cannot be accessed safely from a ladder or protected work platform or when the installation of guardrails is infeasible, fall restraint or fall arrest systems may be used. A ESWP will be developed and a Qualified or Competent Person will make the appropriate equipment selection based on a complete evaluation of the work site, conditions, and nature of work to be performed.

- Employees using fall restraint or fall arrest equipment will work in teams of (2) two or more when feasible. If there is only one TEI employee on the job, the ESWP shall note that a customer representative or other individual onsite will be available and monitoring the work in the event of a fall.
- **Fall Restraint Systems** consist of the following components:
 - All equipment must meet applicable OSHA, ASTM and ANSI standards.
 - Anchorage point with a capacity of at least 1,000 lbs.
 - Connecting device (SRL or lanyard) with a length that must prevent access to fall hazards of any kind.
 - Full body harness.
- **Fall Arrest Systems** consisting of the following components:
 - All equipment must meet applicable OSHA, ASTM and ANSI standards.
 - Anchorage point with a capacity of at least 5,000 pounds per person attached.
 - Connecting device with shock absorbing device.
 - Full-body harness.
- **Full-Body Harness**
 - TEI issues FallTech Arc Rated harnesses to all employees who potentially experience fall hazards; excluding those employees who are issued harnesses from their home local union.
 - Harnesses, as well as connecting devices, are issued to an individual so that the harness does not need frequent size adjustments. Harness sizing and fit shall be performed and approved by a competent person.
- **Connecting Devices**
 - All lanyards used for fall arrest must be equipped with a deceleration device. Lanyards without a shock absorbing/declaration device shall only be used in fall restraint applications.

- Self-retracting devices/lifelines (SRD/L) purchased, supplied, and used by TEI shall be Class 2 devices. Class 2 SRDs may be attached to anchorage from above the worker to at the worker's feet. Class 1 devices may only be used at or above the worker's d-ring level which is not conducive to the majority of TEI jobsites and applications; as such Class 1 SRDs are not to be purchased or used.
- SRDs should be anchored be located directly above worker(s) head to eliminate swing falls, wherever it is reasonably practical to do so. Where it is not reasonably practical to prevent swing falls, the swing drop shall not exceed 4 feet (1.22 m).
- All connections to anchors, harness d-rings, or any other pieces of equipment must be compatible.

➤ **Anchorage Points**

- Certified anchor points are manufactured, tested, rated, and labeled as to their capacity. 5,000 lbs. is the capacity of a typical certified anchor point. Certified anchor points are to be used whenever reasonably practical.
- Non-certified anchor points are structural members, equipment, or any other object that has been deemed to be an acceptable anchor by a qualified or competent person. Non-certified anchors must meet the same criteria for capacity as certified anchors. The ESWP must list non-certified anchors to be used and must be approved by a competent person.
- TEI INSTR SAFETY-014 Roof Work R1 20240722 contains further guidance on non-certified anchorage types and requirements.

➤ **Design of Fall Protection Systems**

- Only Thompson Electric designated Qualified Persons may engineer and design fall protection systems such as anchorage points and/or horizontal lifeline systems.
- If commercially available systems are pre-engineered and certified to provide fall protection and comply with regulatory requirements, they may be installed and used under the direction of a Competent Person and do not require a separate design by a Qualified Person.

➤ **Equipment Inspection, Marking & Storage**

- Before each use, the user will inspect harnesses, lanyards, self-retracting lifelines, and connecting hardware for wear, damage, contamination, and other deterioration according to manufacturer's instructions and checklists. Equipment not meeting inspection criteria will immediately be tagged "Danger – Out of Service" and will not be used. Once tagged the equipment shall be given to the Competent Person immediately for proper disposal.
- Annually, a TEI Competent Person will inspect personal fall protection systems according to manufacturers' instructions and checklists. Such systems may include fixed, installed fall protection systems such as self-retracting reels, anchorages, lifelines, or personal systems such as harnesses, connectors, and lanyards.
 - TEI's preferred supplier for all Fall Protection equipment is FallTech.
 - TEI utilizes Supertrack to document and track the annual Competent Person performed inspections.
- The Program Administrator and Warehouse Manager shall oversee the management of the Supertrack database. Inspection forms will include the name of the inspector, the date equipment was inspected, and the results of the inspection. The documentation will be made available upon request.
- Any damaged equipment that is able to be repaired will be promptly removed from service, tagged

and sent to an authorized facility for complete inspection, rebuild if necessary, and recertification before being returned to service by a Competent Person.

- All fall protection system components will be labeled by the manufacturer according to ANSI Z359.14-2021. Only designated Competent Persons are authorized to mark fall protection equipment with other information (i.e., asset number) in appropriate areas to prevent material deterioration.
- When fall protection equipment is assigned to an employee, a canvas fall protection storage bag is issued as well to help protect the equipment from any damaging factors. Unassigned fall protection equipment shall be stored in the designated storage area in the TEI Line Shop until it is to be assigned.

Falling Objects (Overhead Work)

- If work is being done in a location above where others may be working or walking below, access to that lower area must be restricted if any items could be dropped or fall from the higher work level. This can be accomplished through the use of barricade tape, signs, and rigid barriers. Signs and barricades will be removed when the work is completed.
- Tools and material being used over an occupied area must be secured (tethered) to the structure or person if they might be dropped to the lower level. Toe boards must be provided on working platforms and scaffolds over ten (10) feet in height.
- When toeboards are used, erect them along the edge of the working surface for a distance sufficient to protect employees below. Toeboards should be at least 3.5 inches high and capable of withstanding a force of 50 pounds in a downward or outward direction.
- When tools, equipment or materials are piled higher than the toeboards, use screening or paneling erected from the toeboard to the top of the guardrail system to protect employees below.
- Openings in screen should be small enough to prevent objects from falling through.
- Canopies used to protect employees from falling objects should be strong enough to prevent collapse or penetration by any object falling onto the canopy.
- During roofing, do not store work materials and equipment within six feet of the roof edge unless a guardrail system is installed. Materials piled or stacked near the roof edge should be stable and self-supporting.

Illumination

- **Recommended Illumination Levels** – The following table presents minimum illumination intensities for construction areas, ramps, runways, corridors, offices, shops, and storage areas.
 - The values below should be used as minimum requirements. Actual environmental conditions and lighting needs may dictate higher illumination levels. However, higher illumination levels have to be balanced against the hazards of that lighting level.

MINIMUM ILLUMINATION INTENSITIES (PER 29 CFR 1926.56)	
Foot-Candles	Area of Operation
3	General construction areas, concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	General construction area lighting.
5	Indoors: warehouses, corridors, hallways, and exit ways.
5	Tunnels, shafts, and general underground work areas: (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights shall be acceptable for use in the tunnel heading)
10	General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active store rooms, mess halls, and indoor toilets and workrooms.)
30	First aid stations, infirmaries, and offices.
<i>For areas or operations not covered above, refer to the American National Standard A11.1-1965, R1970, Practice for Industrial Lighting, for recommended values of illumination.</i>	

- Illumination is measured in foot-candles. An illumination meter is a piece of equipment that measures illumination of any specified location. This instrument will be used to quantify the work-sites lighting area deficiencies.
- The Site Foreman or Competent Person will identify areas with inadequate or improper illumination through facility and jobsite audits. They will also communicate these illumination deficiencies to the Safety Manager.
- Employees shall comply with all applicable guidelines contained in this section. Additionally, they shall report any unsafe illumination conditions to the Foreman.

Aisles and Passageways

- Where mechanical handling equipment is used, sufficient safe clearances will be maintained for aisles, at loading docks, through doorways and wherever turns or passage must be made.
- Aisles and passageways shall be kept clear and in good repair, with no obstruction across or in aisles that could create a hazard.
- Emergency Exit corridors and doors. The Life Safety Code NFPA 101 and OSHA require that buildings designed for human occupancy must have continuous and unobstructed exits to permit prompt evacuation of the occupants and allow necessary access for responding emergency personnel. The intent of the code is to keep exits free from obstructions and clear of combustible materials.
 - “Temporary” storage of furniture, equipment, supplies, or anything else is not permitted in exit ways. Combustibles, including recyclable waste paper, are not permitted in exit ways.
 - Exit lights and signs will also be maintained in proper condition at all times and immediately reported if deficient.
- Permanent aisles and passageways shall be appropriately marked.

Covers & Guardrails

While TEI does not typically have full control of the construction sites or facilities in which we perform work, it is still our duty to ensure our employees are protected from any fall hazards, including those presented by holes and/or openings. The facility owner or general contractor must be made aware of the hazard and provide prompt corrective actions. Hole covers, opening covers, and guardrails are the best controls for these hazards e.g., skylights, access hatches, trenches, etc.

All covers and guardrail systems must be compliant with 29 CFR 1926.502(i), 29 CFR 1926.502(b), and 29 CFR 1910.29(b), respectively. TEI Safety shall be consulted whether Construction or General Industry regulation apply if it is not clear.

Covers

- Covers shall be labeled with either “HOLE” or “COVER”.
- Covers shall be secured to prevent accidental displacement.
- Covers shall be capable of supporting, without failure, twice the maximum intended load of employees, equipment, and material that may be imposed at one time.

Guardrails

- When used to protect a hole, all unprotected edges of the hole shall be guarded.
- If a hole is used for the passage of materials, no more than two (2) sides shall be removable.
- Guardrail systems shall be constructed from materials that will not cause injury or snag material.
- Guardrail system must have a vertical height of 42 inches, $\pm$ 3 inches, above the surface to which it is attached. The intermediate rail is to be halfway between the top rail and the floor.
- All guardrails must be capable of withstanding a load of at least 200 pounds applied within 2 inches of the top edge in any outward or downward direction.

Stairs, Railings & Guards

- Flights of stairs having four or more risers shall be equipped with standard stair railing or standard handrails. The width to be measured clear of all obstructions except handrails:

Stairways less than 44 inches wide having both sides enclosed	▪ At least one handrail, preferably on the right-side descending.
Stairways less than 44 inches wide one side open	▪ One stair railing on open side.
Stairways less than 44 inches wide having both sides open	▪ One stair railing on each side.

Use of Hoisting Lines

- When hoisting lines are used to raise tools or materials to a roof greater than sixteen (16) feet from ground to eaves without a parapet (or with a parapet less than 30 inches in height), the employee on the roof shall be secured by an approved safety belt attached to a lifeline.
- The safety belt lanyard shall be a minimum of ½ inch nylon, or equivalent, with a maximum length to provide for a fall of no greater than 6 feet. The rope shall have a nominal breaking strength of 5400 pounds.

Housekeeping & Safe Work Practices

- Place “walk-off” mats at building entrances. These mats should be cleaned as necessary to prevent materials from being tracked into the building. Mats should be secured to the floor using adequate materials to ensure that they will not move when stepped on.
- Hard surface floors and walkways should be swept on a regular basis, adequate for the amount of traffic, to prevent the build-up of dust, dirt, or other materials that could make the floor surface slick.

- Any surface which poses a temporary slipping hazard, such as newly washed, waxed, or cleaned floors, wet entry ways, or spills should have barriers and/or signs placed in a manner which clearly indicates the hazards present until the hazard is removed. If possible, these areas should be isolated so that traffic will not pass through the unsafe area.
- Spills should be cleaned up immediately. Any spills involving chemicals or biological agents should be cleaned up by personnel who are trained in the handling and cleanup of such materials.
- Any tripping hazard such as uneven pavement, fixed objects, excess materials, improper storage, broken stairs, etc. should be immediately reported to a Supervisor.
- Do not rush, especially in inclement weather or on slick surfaces.
- Be aware of changes in surface heights (a projection of even ¼ inch could cause a fall.)
- Do not run wires, cables, or other materials across a walkway without proper protection. If you do, make sure to:
 - Use cable chases and/or duct tape to secure the wires to the ground;
 - Provide a highly visible sign which indicates the hazards and can be seen from all approaches;
 - Minimize the height of the cable chases or hazards to less than 1 ½ inch.
 - Wires cannot be run across the main path to or from a fire exit or in such a way as to block a fire door;
 - Wires should only be run under a mat or other floor covering with rubber backing or that was specifically designed for such purpose due.
- All walking areas should be provided with adequate lighting. Take special care in walking through dimly lit areas.
- When walking up or down stairs, always use the handrails provided for support, especially in dark or inclement weather conditions.
- Special care should be taken whenever the walking surface is very smooth, such as with marble or similar flooring materials. Under certain conditions these floors can be slippery as ice.
- All offices, work stations, work areas, passageways, storerooms, restrooms, and service rooms shall be kept clean, orderly, sanitary, and free of known hazards.
- The floor of every workroom and workstations shall be maintained in a clean and, so far as possible, a dry condition. Where wet processes are used, drainage shall be maintained and false floors, platforms, mats, or other dry standing places will be provided where practicable.
- Every floor, working place, and passageway shall be kept free from protruding nails, splinters, holes, or loose boards or other hindrances that would prevent efficient maintenance.
- All employees are responsible for maintaining their immediate work areas in a clean and orderly manner, and for notifying their supervisor of conditions beyond their control.
- Employees will ensure that machines and equipment under their control are maintained in a clean and orderly manner.
- All employees are responsible to ensure that aisles are kept clean, free of material, finished parts, scrap, or any type of debris.
- Maintenance will ensure that all wall spaces are properly maintained in a clean and orderly manner.
- All employees will ensure that tools, equipment and materials under their control are maintained.

- Spills of non-hazardous materials will be cleaned up immediately by the employee responsible for such, or reported immediately to the appropriate supervisor. If the spill cannot be removed immediately, then warning signs or barricades sufficient to warn personnel will be installed.

Training

- A Competent Person must provide training that ensures workers will recognize fall hazards and use appropriate procedures to minimize or eliminate exposure to fall hazards. In addition, employees who use personal fall-arrest systems must know:
 - How to wear the equipment;
 - Appropriate anchoring and tie-off techniques;
 - How to calculate fall clearance;
 - Inspection and storage procedures for the equipment; and
 - Self-rescue procedures and techniques.
- **Retraining** – Employees who do not recognize fall hazards or fail to follow established policy and procedure must be retrained. Other reasons for retraining include changes at a workstation or task that make earlier training obsolete, changes in the types of fall-protection equipment used by workers, or a worker's failure to use fall-protection equipment effectively.
- **Documenting Training is Mandatory** – Thompson Electric will maintain a written record of each employee's fall-protection training. This record must document the employee's name, the date the employee was trained, class agenda, means of gauging competency (pass/fail rate) and the trainer's signature.
- **Competent Persons** - TEI's Competent Persons for fall protection are required to successfully complete an authorized Fall Protection Competent Person course. TEI will also utilize Fall Protection Inspection Competent Persons who must successfully complete a fall protection inspection course. These individuals will only be considered competent in regards to fall protection inspections; they are not authorized to perform any other task that requires a competent person.



Elevated Surface Work Plan

Date:		Site Address:		Job #	
Site/Task Specific Information					
Duration of work:					
Description of work:					
Tools/Equipment used:					
Site-Specific Fall Hazards					
Excavations (provide detail):			Depth/Width of excavations/holes:		
Structure (provide detail including maximum height):					
Proximity to high voltage power lines:			Ground cover/hazards:		
Other/comments:					
Fall Protection Systems to be used (check all that apply)					
☐	Appropriate anchors for system used	☐	Horizontal lifelines	☐	Positioning device system
☐	Covers (holes & openings)	☐	Personal fall arrest system	☐	Rescue Devices
☐	Guardrail/Toeboards	☐	Personal fall restraint system	☐	Controlled Access Zone
☐	Scaffolding/Scissor lift	☐	Scissor lift	☐	Aerial lift
☐	Other (describe):				
Fall Protection System Components (check all that apply)					
☐	Full body harness	☐	Lanyard w/deceleration device	☐	Connecting devices
☐	Vertical lifeline	☐	Carabiner	☐	Fall arrestor/Rope grab
☐	Horizontal lifeline	☐	Anchorage	☐	Self-Retracting Devices
☐	Other (describe):				

Anchor Point Locations and Description; include any devices		
Describe procedures for assembly, inspection, and disassembly of the fall protection system to be used.		
Rescue Plan		
Procedures to follow if a worker falls or needs to be rescued. Attach as necessary. If personal fall arrest system is to be used, discuss suspension trauma with workers. Different types of rescue to discuss; Self rescue, climb or pull yourself to safety, assisted self-rescue, suspension trauma safety straps, ladders, mechanically aided lifts		
Worker, Sub-Contractor, Visitor Worker Acknowledgement		
I acknowledge that I have reviewed the fall protection requirements and procedures for this site with my immediate supervisor and/or site Competent Person and am familiar with the hazards of this work site and fully understand my responsibilities, specifically in relationship to the contents of this Fall Protection Plan.		
TEI Employees		
Print Name	Signature	Date of Review

Every employee, subcontractor employee, visitor is required to review this information regarding Suspension Trauma before Starting Work and Signing-Off the Fall Protection Work Plan



Rescue Plan Checklist – What to do if someone falls & becomes suspended. What is your plan to get this worker down? A Rescue Plan helps everyone understand what to do **BEFORE** a Fall. **Please note this Checklist is not all inclusive, but to be utilized as a guide.**

Date:		Site Address:	
Job #		Subcontractor (if applicable):	
Important Components of a Site Specific Rescue Plan			
☐	Gain an understanding of the physical environment you will be working in		
☐	Determine proximity of a professional rescue team (if available)		
☐	Determine if 911 works from the area where you would be calling & approximate response time		
☐	Understand the type of rescue that may be necessary (lowering victim from structure, ladder, manlift, etc.)		
☐	Determine who is trained and authorized to perform the rescue		
☐	Decide if the rescuers will be on-site or stand-by. If stand-by determine response time.		
☐	Complete the TEI Site Specific Fall Protection Plan & review with all affected employees.		
☐	All rescue equipment and supplies are on-site, inspected and ready to use.		
	☐	Self-Rescue leg straps	
	☐	Ropes and lifelines rated for rescue and evacuation	
	☐	Rescue devices that can raise or lower a victim, such as a controlled rate descent device	
	☐	Designated anchor points for rescue equipment (rated at least 3100 lbs.)	
	☐	Anchor straps and carabiners for making an anchor point when one is not available	
NOTES:			

What is Suspension Trauma or Orthostatic Intolerance?			
One of the effects of being suspended in a harness is tightening of the leg straps that bear the body weight of the suspended person. Gravity pulls the blood down into the legs (venous pooling). This pooling of blood in the legs reduces the amount of blood flowing in the body and so the heart compensates and breathing increases to maintain the flow of oxygenated blood to the brain and organs. When this fails the heart rate slows and the individual faints. This reduced heart rate can critically reduce both the quality and quantity of oxygenated blood to the brain and other vital organs with serious consequences of kidney failure or brain damage. It is strongly recommended that no person remains suspended in a harness for longer than 10 minutes, after approximately 5 minutes the person will most likely become unconscious.			
What to do if you become suspended			
In the event of a fall and when a person may not be able to self-rescue, the work at height rescue plan must be put into immediate effect and emergency services should be contacted. Fall victims can slow the onset of suspension trauma if they are able to do so by use of the following techniques: • Pushing down vigorously with their legs and mobilizing all the limbs will help to maintain the circulation. Frequent “pumping” of the legs against a firm surface will also activate the muscles and improve blood circulation. • Positioning their body in a horizontal or slight leg-high position. • If possible something nearby which the feet can be rested standing up. • The harness design and fall injuries may prevent the individual from being able to do any of the above.			
What are the signs of Suspension Trauma/Orthostatic Intolerance?			
Fainting	Nausea	Breathlessness	Dizziness
Sweating	Unusually low heart rate	Unusually low blood pressure	Paleness
Hot Flushes	Loss of vision	Increased heart rate	Unusually high blood pressure
What to do following the rescue of an individual suspended at a height			
Normal First Aid rules DO NOT apply! The blood that has pooled in the legs that has been prevented from collecting oxygen from the lungs and is now stale, loaded with carbon dioxide and toxins from the bodies metabolizing processes. If the casualty were to be laid down after rescue, the stale blood would rush back to the heart and other vital organs. This rush of deoxygenated blood can cause death by heart attack or a few days later from organ failure. The current recommended procedures following a rescue are to keep the casualty in a knees bent “W” sitting position for at least 30-40 minutes. This partially closes the femoral artery, allowing any pooled blood to be slowly released back towards the heart, allowing the body to reprocess and remove the toxins, etc.			
The only “Exception” to this rule			
The only exception to positioning a casualty in the “W” position is when there is or suspected spinal injury. An individual can be assumed to have suffered spinal injury if they have fallen approximately 6 feet from connecting arresting lanyard at foot level or pendulum. In this instance the individual legs are not to be raised but support the casualty in a body splint or stretcher that acts as a splint with a neck brace & head block. Raise the individual so the head is above their legs to minimize the effects of toxic shock, utilizing gravity to slow the flow of stale blood to the heart and vital organs.			
ALL individuals who have been suspended in an arrested fall should be treated as a medical emergency and immediate medical attention sought.			

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Origination	Safety Div.	Vice President		08/01/12
01	Removed Title Safety Manager & replaced with Safety Director; Defined Supervisory Personnel	Safety Div.	Vice President	01/28/14	01/28/14
02	Introduced site specific fall protection plan with provisions for CAZ for Customer Requirements only	Safety Div.	Management	05/2018	05/01/2018
03	- Updating of Pre-Use Fall Protection Inspection Forms to Mfg. Specific Guidelines issued by FallTech (TEI PFAS approved components) for when internet/WiFi are not available (i.e., Safety Tech to document inspections) - Updated OSHA 29 CFR 1926.56(a) Subpart D; Table D-3 (illumination) - Inclusion of information on TEI's cloud based (i.e., Safety Tek) inspection tracking system for PFAS components - Inclusion of template for site specific rescue plan Checklist	Safety Div.	Management	01/2020	01/04/2020
09/2020	Annual Review – No Changes	N/A	Management w/Safety	N/A	N/A
04	- Restructured the document - Brought into compliance with updated ANSI standards - Removal of information not pertinent to TEI's Fall Protection and WWS uses - Full list of revisions included in 2024 Written Program Updates document.	Safety Department	VP of Ops	11/2024	12/2024



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362



Fatigue Management
Fit for Duty

2020 - 2021

Introduction

This policy and its related procedures have been developed in order to ensure the proper control of fatigue risks that might affect the safety and health of those involved in the work or those affected by the work.

Fatigue related impairment is considered an identifiable workplace hazard. Like any hazard, the controls employed to manage the risks posed by fatigue are based on sound principles. The most effective means to manage the effects of fatigue is to have restorative sleep.

Work rosters are the primary means employers use to establish the working hours of employees.

The first order of control to manage fatigue outlined in this policy is derived by assessing the opportunity that particular work patterns provide for restorative sleep. The duration of breaks or limits of planned rosters promoted in this procedure are based on the opportunity for restorative sleep provided by rostered work patterns.

These procedures are designed to manage the health and safety risks resulting from fatigue-related impairment. Any possible longer term effects of particular work patterns, for example, the psychological effects, are not considered in this policy and its related procedures.

Policy

It is the policy of Thompson Electric, Inc. (herein referred to as TEI) to provide for the well-being of its employees, and affected subcontractor employees, by willingly adhering to the requirements of the Hazard Communication Standard 1910.1200 and other applicable local, state and federal requirements.

Thompson Electric, Inc. has an obligation to minimize the risk due to fatigue on Employees and all levels of Sub-Contractors while at the workplace or while carrying out activities on behalf of our clients. This is supported by the organization's Fatigue Policy.

Where the effects of fatigue and/or the nature of the work being performed induces fatigue, causing impairment to a person's health and safety, Thompson Electric will ensure that appropriate and reasonable management action, consistent with this procedure, is taken.

The objective of this procedure is to provide appropriate knowledge, skills and tools for the safe management of fatigue to:

- Ensure adequate opportunity is available for employees, contract employees, sub-contractor employees sufficient rest before commencing work, through appropriate working time arrangements.
- Monitor and control working hours, including overtime, to provide time arrangements that do not require excessive periods of wakefulness.
- Maintain a safe and health work environment.
- Identify, develop and implement a fatigue management plan with control strategies to address fatigue related risks within the workplace in consultation with the employees.
- Encourage persons affected by work and non-work related fatigue to seek assistance.
- Enable the appropriate people to perform their role and responsibilities while maintaining the privacy and confidentiality of people participating in fatigue management.
- Provide training and education for employees, contractors, subcontractors, and their families to foster a common understanding of fatigue management.
- Develop a culture of shared responsibility for fatigue management.
- Promote healthy lifestyles at work and at home.
- Conduct regular crew based safety observations to ensure elements of this policy are effectively implemented.

Definitions

24-hour Period – A “rolling” period of 24 consecutive hours.

Active Work - Total time spent at work including overtime. This does not include time traveling to or from the work site or rest breaks during shifts.

Employee/Worker - Any person who works on the site, regardless of their employer. This includes contractors.

Employer - Any person or organization responsible for the employment of one or more employees/workers on site.

Extended Working Hours - Any working hours in excess of established rostered hours, including overtime.

Fatigue - A state of impaired physical and/or mental performance and lowered alertness. In a work environment this can mean that a person is also unable to function safely. Influences on fatigue include, but are not limited to, restorative sleep, physical or mental activity, refreshment, time of day and length of time awake.

Fatigue Assessment – Is a process to assist in determining fatigue risk level and suitable control measures for Personnel. It may be used for situations such as call outs, extension of work time (i.e., mandatory overtime), due cause, etc.

Fit for Duty – Means that an individual is in a state (physical, mental, and emotional) which enables them to perform assigned tasks completely and in a manner which does not threaten or compromise the safety or health of themselves or others.

Restorative Sleep – Restorative sleep is the process by which the body overcomes fatigue. It involves cycles of deep sleep that allow a person to recuperate and wake up refreshed.

Rostered Hours - The hours for which an employee/worker is rostered to work.

Time Not Working - Time outside of working hours. Does not include time traveling to or from the work site.

Work Cycles/Rosters -The working period scheduled between any significant break away from work.

Work Schedules - The hours to be worked for each day, shift, week, month or year, as scheduled by the employer.

Shift - The hours between the start and finish of established rostered hours.

Training

Thompson Electric employees are required to attend an initial (i.e., employee orientation) and annual information session that will enable them to:

- Identify the risks associated with fatigue;
- Recognize symptoms and behaviors associated with the effects of fatigue, including support mechanisms; and
- Determine whether their behavior is consistent with relevant fatigue management policies.

This training program will be on-going and flexible.

Roles & Responsibilities

Management will foster a safety culture and develop Competent Employees by the following:

- Eliminate, or where they cannot be eliminated, control fatigue risks.
- Educate its Employees about the impacts of fatigue.
- Offer rehabilitation and assistance to any Employee, taking into account the person's right to privacy and confidentiality.
- Provide leadership and commitment through the allocation of resources and Personnel for the establishment, implementation, evaluation and review of this fatigue management program.
- Review, monitor and track all aspects of the fatigue management program to ensure compliance company-wide, as well as continuously identifying areas for improvement.
- Ensure that the fatigue assessment process is utilized and documented.
- Ensure workers performing shift work are properly supervised and that tasks are undertaken safely.
- Provide appropriate fatigue management training.
- Develop and implement agreed working rosters to ensure adequate opportunity for restorative sleep is provided.
- Provide support processes, policies and services for Personnel.
- Ensure that if a person's capacity to work safely is reduced by fatigue, they can notify their supervisor without fear of adverse repercussions.
- Ensure that privacy and confidentiality is maintained.
- Take appropriate actions where breaches of the procedure have occurred.
- Provide an Employee Assistance Program (EAP) that places emphasis on the recognition and management of fatigue.

The **Safety Department** shall:

- Oversee the implementation of this policy and its related procedures at the workplace, including individual work sites.
- Investigate apparent breaches of the provisions of this procedure.
- Ensure that privacy and confidentiality is maintained.
- Ensure that the Employee and workplace orientation processes include education on the standards, obligations and responsibilities of this policy.
 - During Employee and workplace orientation, providing appropriate information, instruction and training to employees to ensure they understand the adverse effects of the chronic use of alcohol, over-the-counter, and prescription drugs and any other product which may affect their ability to perform their work safely.
- Ensure that investigations of incidents assess the effects of fatigue.
- Assist Supervisors and Managers in applying this procedure. This includes facilitating access to counseling, rehabilitation and other assistance services when required.
- Supply training reports to clients and Thompson Electric Management.
- Work with Management to monitor the application of this procedure and regularly assess the suitability and adequacy of this procedure through crew based safety observations; identifying any aspects that can be improved and report accordingly to the Vice President of Operations about those matters.
- Ensure that privacy and confidentiality is maintained.

Project Managers and Site Supervisors shall:

- Assist in and implement this policy and its related procedures to minimize the causes of work-related fatigue, and assist supervision in making “Safety Critical” decisions along with the appropriate actions to take with employees.
- Ensure that information and education regarding this policy are provided during work site orientation.
- Ensure that, to the extent possible, fatigue is considered in planning working rosters, work allocation and scheduling, taking into account the range of matters set out in the Risk Evaluation section of this policy.
- Identify and advise the Safety Department and/or Management about issues with the practical application and operation of this policy and any areas for improvement.
- Consult with appropriate Personnel, arranging suitable alternate duties (where possible) and/or a safe location for a person impaired by fatigue.
- Ensure that fatigue is considered in the investigation of any incident.
- Maintain privacy and confidentiality, including acting on reports of concern about privacy and confidentiality.
- Facilitate other actions as defined under this policy.
- Recognize and assess the signs, symptoms and management of fatigue in employees (refer to **Appendix 1**).

Employees shall:

- Not willfully place their own, or others’ health and safety at risk;
- Make every reasonable effort to be fit for work while:
 - at work;
 - on call;
 - driving a company vehicle; or
 - operating company or equipment.
- Notify their Supervisor immediately if:
 - Their work performance is affected by fatigue/tiredness, lack of mental acuity; or
 - There is any risk to themselves or others due to the effects of fatigue;
- Notify their Supervisor or other responsible person immediately if a fellow co-worker or sub-contractor will not self-manage their potential impairment.
 - When there is a potential risk to their, or others’ health and safety if they suspect or observe an individual in the workplace behaving in a manner that suggests fatigue-related impairment (refer to signs and symptoms in **Appendix 1**).
- Encourage other Personnel to comply with this procedure;
- Participate in fatigue assessments, if requested;
- Report any actual or potential fatigue risks; and
- Fulfill their obligation to arrive at work fit for duty.
- All Personnel are encouraged to use time away from work to obtain sufficient restorative sleep to ensure fatigue-related risks are managed to an acceptable level.
- Employees must not chronically use over-the-counter or prescription drugs to increase mental alertness.
- Employees are discouraged from taking any substance known to increase fatigue in that employee, including fatigue that sets in after the effects of the drug wear off.

General Working Hours

Management and Supervisory personnel shall utilize the guidelines below to set work hour limitations and implement job rotation schedules to control fatigue, allow for sufficient sleep, and increase our workers' mental fitness. This will assist not only in controlling absenteeism, but reducing employee turnover:

- Before assigning extended working hours, consult employees to ensure they are in a state where fatigue would not significantly impact on safety while at work or travelling to and from work;
- Maximum average weekly working hours should not exceed 60-hours per week over four weeks;
- It is recommended that the maximum hours should not exceed 672 over a three-month period;
- At least two full days (24-hours per day) shall be taken off in a 14-day period (either concurrently or individually). An employee should not be on call during these two (2) days.
- Ensure breaks are taken in accordance with the schedule, and as applicable;
- A maximum of 16-hours is worked in any 24-hour period, including any travelling time to and from the depot, worksite or home; and
- **Normal work schedules:** If the maximum 16-hours is worked the employee must be released from duty for a minimum of 10-hours.
- **Storm Work Hours:** If the maximum 16-hours is worked the employee must be released from duty for a minimum of 8-hours (16+8=24 hours)
- The following table provides additional/alternative guidance for Planning (i.e., Administrative controlled) Rosters to aid in the control of worker fatigue:

Situations	Basis	Value
Limit number of actual work hours in any 7 day period.	6 attendances consisting of a maximum of 12 hours each	72 hours
Shift Change-Over for continuous shift for Personnel in roles such as: Operators, Supervisors, Inspectors, etc.	In addition to 12 hour shift, maximum 30 minutes per shift	3 hours (6 attendances x 30 minutes)
Planned maximum hours of work (not inclusive of Shift Change-Overs).	12 hours	12 hours
Long break frequency.	Minimum 24 hours with no financial disadvantage to employees	1 break in every 7 days
If Personnel are required to work continuously for 4 or more nights, the person will have a rest period after change from night work/shift before returning to day time roster.	4 or more night shifts consecutively	48 hours (To support 2 night's sleep)*
Rest period after change from night work/shift before changing to a different roster (i.e., afternoons, day shift) (where night work/shift has been worked continuously for 3 or more weeks).	Minimum 48 hours*	48 hours (To support 2 night's sleep)*
* The 48-hour rest period may occur at any time during a rostered period. Breaks which fall on normal projected roster working shifts will be paid as if at work.		

The following table provides additional/alternative guidance for Contingency and Call-Out Rosters to aid in the control of worker fatigue:

Situations	Basis	Value
Limit number of actual work hours in any 7 day period.	Inclusive of call outs.	Normal roster plus 24 hours after which a 24-hour break must be taken without financial disadvantage.
Maximum continuous hours worked in a 24 hour period inclusive of time worked as a result of unplanned contingency.	16 hours	16 hours
Unplanned contingency – After a work period of greater than 12 hours, further work periods of greater than 12 hours cannot be worked unless there has been a 24-hour break.	16 hours	Up to 16 hours
Minimum short break duration (Hours) following a call out or contingency.	10 hours	10 hours
Call outs – Maximum hours worked in a 24-hour period, starting from commencement of the previous attendance.	16 hours	16 hours

Breaks Within Shifts

Supervisory personnel may self-select (with the guidance of the applicable collective bargaining agreement) the timing of work breaks within their schedule (i.e., staging of work) to assist in managing fatigue and increasing mental fitness:

- Further breaks may be needed based on the physical need for hydration and sustenance (i.e., extreme work conditions such as hot weather or work conditions, extreme cold, work outdoors), metabolism, work load, nature of work, etc.
- The changing of assigned work tasks shall not be considered as a break.

Risk Assessment & Hazard Identification

Risk assessment can be adapted to the process of fatigue management. By identifying and assessing the various tasks that can result in undue fatigue, countermeasures can be easily chosen and planned. This section will concentrate on matters related to fatigue that can be implemented in the risk assessment process.

Hazard Identification

- Fatigue amongst employees is a hazard in the workplace. Thus, it is important to establish the fatigue factors associated with the different work activities and the potential incidents that may occur as a result of fatigue. It is important to note that such factors are often interrelated to one another.
- To identify fatigue hazards in the workplace, the following factors need consideration:
 - Trends of accidents; and
 - Rates of occupational health and injuries.

- Consider if fatigue could have been a contributing cause to a workplace incident during the investigation process. When an incident occurred, the following questions can help to ascertain if fatigue had been a contributing factor:
 - Time of accident: Ask; Did the accident happen at night? Did the accident happen when the worker's concentration was poor?
- Working hours: Has the employee been working long hours and shift work continuously?
- Facility condition: Is the facility conducive for the work carried out?
- Was the employee exposed to adverse working conditions such as exposure to chemicals, heat, dust due to poor ventilation, noise due to poor acoustic design, and poor visibility due to dim lighting?

Risk Evaluation

Risk evaluation is the process of estimating the risk levels of the identified hazards and deciding whether the risks can be accepted. This is used as a basis for prioritizing actions to control identified hazards and thereby, minimizing risks. Work tasks are not only to be evaluated on the pre-job Task Hazard Analysis, but by division management annually for fatigue management and how ergonomic devices, designs, etc. can improve our work stations and related tasks.

Risk Factors & Control Measures:

Supervisory Personnel should address the following issues when analyzing work tasks to control worker fatigue:

Risk factors that contribute to fatigue:

- Prior sleep and wakefulness – the amount of sleep they have had prior to work and the duration of their work period; Inadequate recovery from interrupted or poor quality sleep.
- Working without a rest break to meet critical deadlines/milestones.
- Sleep patterns affected by frequent call outs over a limited period and extended hours of work.
- Work tasks/activities requiring concentration or high levels of muscular exertion for extended periods of time.
- Tedious and monotonous work as well as heavy or exhausting physical activity.
- Working in high risk situations.
- Working successive shifts, frequently on call out, and regular emergency work outside standard work hours. Accepting work which results in exceeding working hour limits; working swing shifts or graveyard shift.
- Working in high heat or cold temperatures or humid conditions.
- External factors can affect fatigue risk level while at work: Excess hours/Overtime; or extended Shift work and Rostering Arrangements with early starts or late finishes over successive days.
- Sub-Contractors and Outages
- Emergency Works/Time of day – incidents are more likely to happen at night time, especially between the hours of 2am to 6am.
- Length of shifts worked – the effects of fatigue are cumulative, workers are more likely to feel fatigued in the final hours of a shift, than in the first few hours of a shift.
- Lack of opportunity to recover from fatigue – incidents are more likely to occur if workers are not given a sufficient opportunity to recover from fatigue.
- How often the situation occurs – generally, the more often a worker is fatigued, the greater the likelihood is that an incident will occur.

- How many people are fatigued – generally, the greater the number of people who are fatigued, the more likely an incident is to occur.
- The skills and experience of persons fatigued – consider training and competency both to perform work-related tasks and manage fatigue.
- Any special characteristics of the people involved – for example, if a worker is on medication for a medical condition that is affected by circadian rhythms and night shift work (such as for asthma, depression or diabetes).
- Workers shall be educated that they should not chronically use over-the-counter or prescription drugs to increase their mental alertness. Management will discourage employees from taking any substance known to increase fatigue in employees, including fatigue that sets in when the effects of the drug wear off.
- The duration of exposure to fatigue - generally, the longer a person is fatigued, the more likely an incident will occur.
- The level of risk inherent in the work – incidents are more likely to occur in work that is generally hazardous, such as when operating heavy machinery.
- Rest breaks – Mental fitness can be improved by increasing the number and duration of breaks taken during extreme weather conditions, increased manual tasks and providing sufficient chairs, seating areas (i.e., benches inside job trailers), etc. for employees to sit and take breaks. These areas should also have the ability for the employees to seek shade, heat, noise exposure, etc. and be in or out of the elements while taking their breaks.
- Occupational exposure levels – extended exposure on longer shifts to noise, dusts, chemicals.
- Number of consecutive night shifts worked.
- Shift rotation – relevant shift changes and start/finish times.
- Sleep inertia – drowsiness after being woken.
- Commuting – time spent travelling reduces time available for recovery.
- Proximity of worker's residence or accommodation – method of travel to and from work and the risk of commuting incidents.
- Manual tasks – forces used to push, pull, lift, carry, reach or dexterity required for work and ergonomics – body position and location – confined or cramped work spaces.
- Inability to access food and refreshments for a balanced diet and proper hydration.

Control Measures

- Redesigning work practices so that routine administrative tasks are minimized for night shift workers, allowing them to focus on core duties during night work.
- Scheduling later start times so that maximum night sleep can be obtained before starting work (however this can affect those on night shift).
- Scheduling low risk work during periods of high fatigue, such as night time, especially during the hours of 2am to 6am) and/or in the latter half of shifts.
- Scheduling complex tasks to be performed only during the day.
- Sufficient supervision, particularly during periods of high fatigue (such as night-time, or in the latter half of shifts) and especially for hazardous work.
- Contingency plans if workers become fatigued – this would involve removing fatigued workers from work activities where there is a considerable risk to health and/or safety (i.e., operating heavy machinery).
- Effective emergency responses.

- Strict controls and procedures if performing hazardous work during high fatigue periods (especially during 2am to 6am).
- Job rotation for repetitive or monotonous work, or work that involves heavy physical demands.
- Provisions for the supplying, training and use of ergonomically friendly tools and equipment to improve workstation conditions.
- This shall include, but not be limited to anti-fatigue mats for standing, lift assist devices for repetitive lifting, proper lighting and control of temperature (or ability to seek rest in a shaded area during warm weather and heat during cool weather), adjustable work tables, etc.

Appendix 1 – Sign & Symptoms of Fatigue

Physical	Mental	Emotional
Yawning	Difficulty concentrating on a task	Quieter and introverted (i.e., if not normal state)
Heavy Eyelids	Lapses in attention	Lacking energy
Eye-Rubbing	Difficulty remembering what you are doing	Mood changes, decreased tolerance
Head Drooping	Failure to communicate important information	Emotional outburst, aggressive rage
Micro Sleeps	Failure to anticipate events or actions	
	Accidentally doing the wrong thing (error)	
	Accidentally not doing the right thing (omission)	

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	• Origination	Safety Div.	Safety Director	N/A	05/2019
01	• Under responsibilities – Safety will work with Management on Crew Based Safety Observations to identify aspects of this program that can be improved upon • The Vice President of Operations is the reporting authority for the Safety Department • Changed Responsibilities from Site Managers to Project Managers • Added clarification of Storm Work Hours under General Working Hours	Safety Div.	Management w/Safety	08/2020	08/2020
09/2020	• 30 Day Review – No Changes	N/A	Management w/Safety	N/A	N/A



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362



Fire Protection
Fire Extinguishers

2020 - 2021

Introduction

Fire protection and prevention is important to Thompson Electric to minimize loss of life and property. The cost of fire protection is small compared to potential costs of incalculable human suffering and lost property.

Because every employee and/or outside contractor on a Thompson Electric work site or work area is expected to help minimize the potential for fires and to maintain the equipment necessary to control fires, every person performing work for Thompson Electric will be affected by these safety policies and procedures.

Because it is unsafe for an employee who has not been properly trained in fire extinguisher use to control an incipient fire, Thompson Electric prohibits any personnel who have not been successfully trained in the use of fire extinguishers to attempt to utilize one.



Actual fires will be reported immediately to the local fire department before any attempts are made to extinguish the fire.

Employees will not attempt to extinguish fires beyond the incipient stage.

Training

Employee fire protection and prevention training will include, but not be limited to:

- Notification of the Fire Department immediately upon learning of a fire;
- Evacuation Procedures and designated meeting area(s);
- Classification, Ratings, and Performance of Fire Extinguishers;
- Classification of Hazards;
- Location of Fire Extinguishers;
- Proper operation of the fire extinguisher before attacking the fire (i.e., PASS method);
- Hazards involved with the fighting of incipient stage fire fighting (i.e., becoming trapped, overcome by smoke, burns, etc.)

Additionally, the "Company's" Supervisory Personnel and Designated Employees will be trained in:

- Selection and Distribution of Extinguishers;
- Inspection, Maintenance, and Recharging of Extinguishers.

All Employees, regardless of status, will be trained prior to initial employment and at a minimum annually thereafter.

- **Outside Personnel (sub-contractors, vendors, etc.)** – Will be trained as a "Company" Affected Employee or Designated Employee (level of training and qualification to be determined by the President) as deemed appropriate to the individual situation(s). The "Company's" Authorized Employee may be assigned to oversee all activities of Outside Personnel to ensure compliance with the scope and applicability of this policy.

Portable Fire Extinguishers

- Fire extinguishers are manually operated, portable devices that will discharge an extinguishing agent when properly activated. They are designed as a method of controlling a fire during the time between discovery and arrival of the Fire Department.
- Thompson Electric shall provide portable fire extinguishers that are:
 - Consistent with the hazard.
 - Properly mounted and located.
 - Inspected, maintained, and tested.
- Portable fire extinguishers will be selected and distributed based on the classes of anticipated fires, and the size and degree of hazard. Most fires in the “Company’s” operations will include materials found in Classes A, B, and C. Thus, the most common type of extinguisher Thompson Electric will provide will be designed to effectively suppress these particular conditions. However, fire extinguishers for Class D fires will be provided when hazards associated with Class D fires exist. The chart below gives a brief outline of the type of fire extinguishers:

Know your Fire Extinguisher

Symbols found on fire extinguishers and what they mean		 WATER	 FOAM SPRAY	 ABC POWDER	 CARBON DIOXIDE	 WET CHEMICAL
Wood, paper & textiles		✓	✓	✓	✗	✓
Flammable Liquids		✗	✓	✓	✓	✗
Flammable Gases		✗	✗	✓	✗	✗
Electrical Contact		✗	✗	✓	✓	✗
Cooking oils & fats		✗	✗	✗	✗	✓

Fire Extinguisher Mounting or Placing

- Portable fire extinguishers must be mounted and located so that they are easily identified and accessible to all employees. Mount in a location where it cannot be blocked by cabinets, equipment or tools.
- Mount fire extinguishers with brackets or make a stand painted red so that they are easily located throughout the work site.
- A fire extinguisher of a rating of at least 10B must be provided within 50 feet of wherever 5 gallons of flammable or combustible liquids or 5 lbs. of flammable gas are being used on a work site and anywhere hot work is being performed.
 - Fire extinguishers being used for short duration activities do not need to be mounted.
 - Fire extinguishers are to be properly returned to storage after short duration activities.
- Fire Extinguishers shall be located along normal paths of travel, including exits from an area. All paths to fire extinguishers must remain clear to provide easy access.
- Fire Extinguishers in company vehicles shall be firmly secured and readily accessible.

Inspection, Maintenance, & Recharging of Extinguishers

- Monthly Inspections – Extinguishers must be inspected monthly. The person performing the inspection must record his/her initials and the date the inspection was completed on the extinguisher tag. The inspection must include the following items:
 - The extinguisher is located in the designated place;
 - No obstructions to access or visibility;
 - Operating instructions on name plate are legible and facing outward;
 - Seals and tamper indicators are not broken or missing;
 - Determine fullness by weighing or “hefting”.
 - Exam for obvious physical damage, corrosion, leakage, or clogged nozzles;
 - Pressure-gauge reading or indicator is in the operable range or position.
- Portable fire extinguishers are to be recharged after use or pressure leakage. Fire extinguishers will be equipped with an inspection tag, and the inspector must initial and date the tag each month to document the inspection. Tags will be replaced when all lines are used or when tags are lost or removed.
- Any extinguisher that shows excessive wear, damage or unserviceable condition will be removed from service and replaced by an operable extinguisher.
- Fire extinguisher maintenance will be performed at least annually by an approved contractor only **(states require a licensed individual to perform this action)**. This annual inspection is intended to give maximum assurance that extinguishers will operate effectively and safely. Annual maintenance and inspection records will be maintained from one annual inspection to the next (at which time the old inspection record is replaced by the new inspection record).
- During any period when an extinguisher is removed from service for testing, another extinguisher must replace the extinguisher out for testing.
- Annual inspection records will be maintained for review by regulatory agencies and for internal audit purposes.

- Portable fire extinguisher hydrostatic testing schedule is as follows:

Type of Extinguisher	Test Intervals (Years)
Soda acid (stainless steel shell)	5
Cartridge operated water and/or antifreeze	5
Stored pressure water and/or antifreeze	5
Wetting agent	5
Foam (stainless steel shell)	5
Aqueous Film Forming Foam (AFFF)	5
Loaded stream	5
Dry chemical with stainless steel	5
Carbon Dioxide	5
Dry chemical, stored pressure, with mild steel, brazed brass or aluminum shells	12
Dry chemical, cartridge or cylinder operated; with mild steel shells	12
Dry powder, cartridge or cylinder operated with mild steel shells.	12

Emergency Reporting

- For emergency reporting purposes, at least one readily accessible telephone shall be located at all Thompson Electric work sites. This telephone shall be in an area that is not subject to being locked (during normal operating hours).
- When reporting a fire, the emergency dispatcher may request only brief information when you call. He/She will put you on hold to dispatch the Fire Department, then ask for more detailed information.
- In an emergency:
 - Call 911 (unless otherwise instructed, alternate numbers will be posted by the phone).
 - Briefly state what happened and where it happened.
 - Indicate if anyone was hurt and how badly.
 - Give your name and the phone number (or extension) you are calling from; do not hang up unless the dispatcher tells you to.
 - Wait in the area until the Fire Department arrives and to provide information to the Incident Commander.
- In large facilities, have someone meet the Fire Department personnel at the entrance to guide them to the scene.

- The emergency dispatcher may need the following additional information for specific types of emergencies:

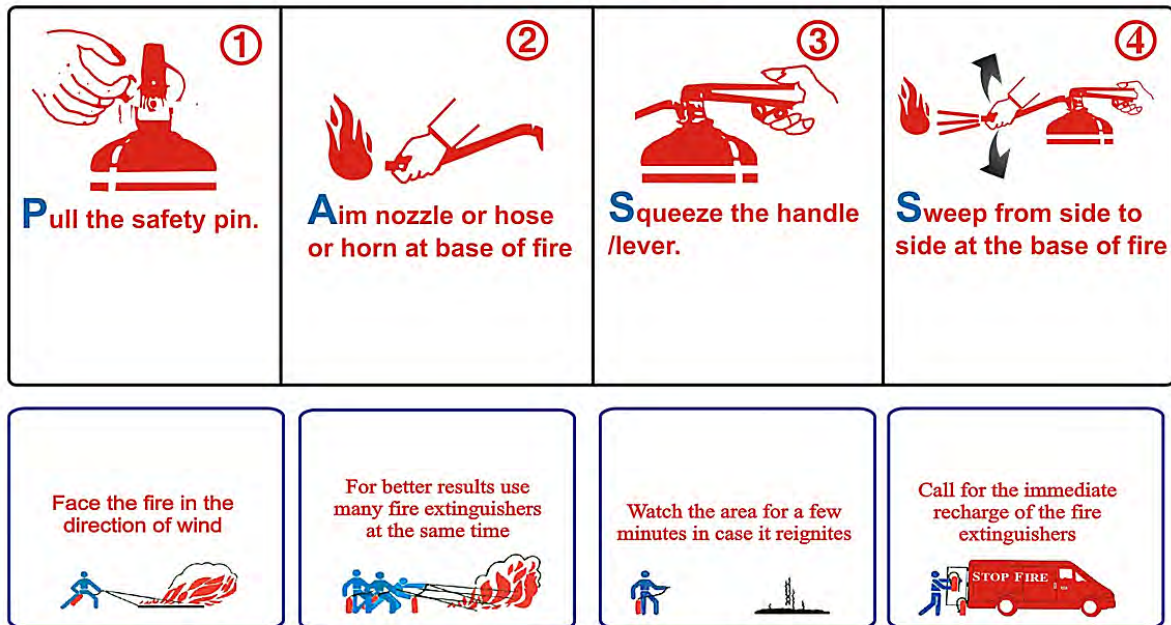
Fires	▪ What is burning? ▪ Is the fire small or large?
Emergency Medical Assistance	▪ Is the person conscious or unconscious? ▪ How many people are injured?
Hazardous Spills	▪ The name of the material spilled, including the correct spelling if known. ▪ Is the material a liquid, solid, or gas? ▪ Has anyone been exposed to the material? ▪ Has the flow of the material been contained or stopped?
Actions	▪ Report any actions that may have, or are being, taken: - Attempts to extinguish the fire; - Whether the area has been evacuated; - Whether CPR or other first aid has been started.

- This information will help emergency response personnel anticipate, and prepare for, any actions that may be required upon their arrival on the scene.

Using a Fire Extinguisher

- It is unsafe for personnel who have not been trained in the proper use of a fire extinguisher to attempt to use a fire extinguisher to control a fire. Personnel who have not been trained in the use of fire extinguishers must not attempt to use them.
- In case of a fire:
 - Evacuate the building and/or area;
 - Call the fire department;
 - Make sure the fires is small;
 - Make sure you have a clear way out;
 - Make sure the fire extinguisher is rated for the type of fire and that you know how to use the extinguisher;
 - Start as far away from the fire as possible. The **“Pass Word”** is a method for operating most common fire extinguishers. It is a four step method.

PASS METHOD



And as always in the case of any fire, Remember the R.A.C.E Acronym

R	RESCUE Assist anyone in immediate danger and help get them to a safe area as fast as possible.	
A	ALARM Alert others by activating any available alarm system. Contact 911 to report location of fire and alert on-site personnel.	
C	CONTAIN Confine the fire as much as possible by closing doors and windows behind you during evacuation.	
E	EXTINGUISH Only attempt to put out the fire if it is small, you have proper equipment and it is safe to do so yourself.	

Human Life is always the highest priority!

Fire Extinguisher Mounting & Inspection Guidelines



- Fire extinguishers must remain readily accessible and properly mounted.
- Extinguishers will be visible from a distance of at least 3 feet. Wall markings for fire extinguisher locations (see examples to the left) will be visible from a distance of at least 25 feet.
- Employees expected to utilize fire extinguishers must be properly trained (including hands on training) in the proper use, limitations, inspection, storage, etc. of fire extinguishers.
- Proper documentation of training/re-training must be maintained.
- Proper use, care and inspection policy, of fire extinguishers, needs to be implemented with outdated fire extinguishers being replaced with ones that meet current regulations.
- The monthly cursory inspection should include (at a minimum) the following items:
 - Insure access to the extinguisher is not blocked and that the cabinet door, if any, opens easily.
 - The pressure should be within the recommended level on extinguishers equipped with a gauge (such as that shown below). The needle should be in the green zone. If the needle is not in **green zone**, the extinguisher requires professional maintenance and this should be noted on the inspection report.
- Verify the locking pin is intact and the tamper seal is not broken.
- Visually inspect the hose and nozzle to ensure they are in good condition.
- Visually inspect the extinguisher for dents, leaks, rust, chemical deposits or other signs of abuse/wear and note any findings on the inspection report. If the extinguisher is damaged or needs recharging, remove it from service and note this on the inspection report.
- Fire extinguishers must be pressure tested (a process called hydrostatic testing) every six (6) years to ensure the cylinder is safe to use. The inspection sheet has all hydrostatic testing dates noted. If an extinguisher requires this service, this should be noted in the comments. Facilities Services will arrange for testing.



Commonly Asked Questions:

WHY ARE MONTHLY INSPECTIONS NECESSARY WHEN THE FIRE EXTINGUISHER SUPPLIER CONDUCTS AN ANNUAL INSPECTION?

An annual inspection is too infrequent to detect habitual vandalism or malfunctions that occur. Without monthly inspections, a fire extinguisher could be inoperable and no one would know until it was needed.

MUST MONTHLY INSPECTIONS BE DOCUMENTED?

Yes. The authorized company representative should document inspections on the tag that is attached to the fire extinguisher. The tag must be present. If it is not present, or it is illegible, you are required to remove the extinguisher from service and replace immediately with a functioning properly tagged fire extinguisher.

SHOULD PROBLEMS NOTED DURING THE INSPECTION BE MARKED ON THE TAG?

No. Only the inspector's signature and date should be marked on the tag. If a problem is noted during the inspection the fire extinguisher should be removed from its mounting immediately, replaced with a functioning fire extinguisher and the faulty extinguisher sent back to the shop.

WHO WILL REPLACE THE MONTHLY INSPECTION TAG?

The fire extinguisher supplier will install the new tags when the annual inspection is performed. If you have a fire extinguisher that receives a new tag before the old one is completely filled in, the next inspection should be recorded beside the proper month of the new tag.

- Only a state licensed contractor may perform annual inspection and/or replace tag or re-tag a fire extinguisher. If the tag is missing replace with a properly tagged extinguisher immediately.

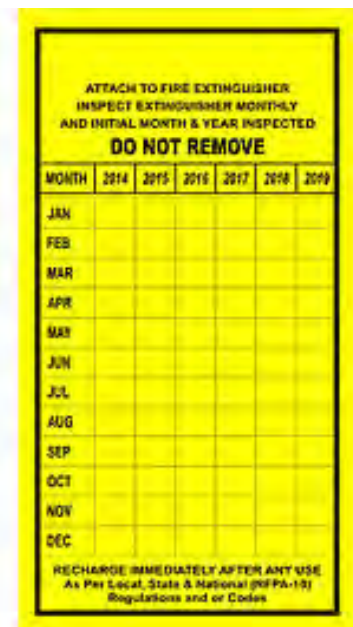


MONTHLY FIRE EXTINGUISHER INSPECTION RECORD

INSPECTION CHECKLIST

1. Access to, or visibility of, the extinguisher shall not be obstructed.
2. The operating instructions on the extinguisher nameplate shall be legible and facing outward.
3. Has the extinguisher been actuated or tampered with? Any seals or tamper indicators that are broken or missing shall be replaced immediately.
4. Visually examine externally. Check that there is no obvious physical damage or condition that would prevent operation of the extinguisher.
5. Inspect for any evidence of corrosion, leakage or mechanical injury. If so, extinguisher needs to be hydrostatically tested.
6. Check that the extinguisher is fully charged and operable. Be sure hose and/or nozzle is unobstructed.
7. Sign-off inspection on reverse with the date (month/year) and inspection initials.

RECHARGE EXTINGUISHER AFTER ANY USE.
INSPECT MONTHLY
INITIAL ON REAR OF TAG



ATTACH TO FIRE EXTINGUISHER
INSPECT EXTINGUISHER MONTHLY
AND INITIAL MONTH & YEAR INSPECTED
DO NOT REMOVE

MONTH	2014	2015	2016	2017	2018	2019
JAN						
FEB						
MAR						
APR						
MAY						
JUN						
JUL						
AUG						
SEP						
OCT						
NOV						
DEC						

RECHARGE IMMEDIATELY AFTER ANY USE
As Per Local, State & National (NFPA-10)
Regulations and/or Codes

Are live Fires required as part of Training?

OSHA Letter of Interpretation: JULY 2, 1991, 1910.155(c)(141)

1. "OSHA does not require that fires actually must be started and extinguished to simulate emergency fire conditions during employee training.
2. "Hands-on" training does not necessarily mean "live fire" demonstration. However, when conducted, live-fire demonstrations should be conducted under qualified supervision at a facility appropriate for the purpose.
3. As a minimum, hands-on training should include the actual discharging of fire extinguishers appropriate for the type of fires expected, un-racking of standpipe hoses, and test-sounding of fire alarm boxes."

Construction Areas

- Construction areas shall be maintained in a fire-safe condition. This includes:
 - Maintaining egress paths and ensuring that the construction site is accessible to the Fire Department;
 - Consulting the local Fire Department regarding specific access requirements for construction sites.
 - Accumulations of combustible waste material, dust, and debris shall be removed from structures and their immediate vicinity at the end of each work shift or more frequently if necessary for safe operations.

Flammable & Combustible Liquids

- Flammable and combustible liquid fires are much more volatile than those fueled by ordinary materials such as wood, paper and cloth. Flammable vapors ignite with explosive force. The resulting fire gives off twice as much heat, has a greater rate of temperature rise and spreads faster than fires from ordinary materials.
- Because of these hazards, special precautions are required when storing, handling and using flammable and combustible liquids. In addition to our customer requirements, both the National Fire Protection Association (NFPA) and the International Fire Code Institute (IFCI) have developed guidelines for the safe storage and use of flammable and combustible liquids. These guidelines are not mandatory unless a federal, state or local authority chooses to enforce them.
- The Occupational Safety and Health Administration (OSHA) has developed mandatory regulations for the safe storage and use of flammable and combustible liquids for general industry (29 CFR 1910.106), the construction industry (29 CFR 1926.152) and the shipyard industry (29 CFR 1915.36).
- To understand the OSHA requirements for the safe storage, handling and use of flammable and combustible liquids, the differences between a flammable and a combustible are as follows:

Flammable liquids

- A flammable liquid has a flash point below 100°F [(37.8°C) (except for any mixture having components with flash points of 100°F (37.8°C) or higher, the total of which make up 99 percent or more of the mixture] according to 1910.106(a)(19). Flammable liquids are known as Class I liquids and are divided into the following classes under 1910.106(a)(19):

Class IA	These liquids have a flash point below 73°F (22.8°C) and a boiling point that's below 100°F (37.8°C).
Class IB	These liquids have a flash point below 73°F (22.8°C) and a boiling point at or above 100°F (37.8°C).
Class IC	These liquids have a flash point at or above 73°F (22.8°C) and below 100°F (37.8°C).

➤ **Combustible Liquids:**

A combustible liquid is any liquid with a flash point at or above 100°F (37.8°C), according to 1910.106(a)(18). Combustible liquids are divided into the following two classes under this regulation:

Class II	Liquids having flash points at or above 100°F (37.8°C) and below 140°F (60°C) (except any mixture having components with flash points of 200°F (93.3°C) or higher, the volume of which makes up 99 percent or more of the total volume of the mixture.
Class III	These liquids have flash points at or above 140°F (60°C). Class III liquids are further subdivided into subclasses Class IIIA and IIIB.
Class IIIA	Liquids have flash points at or above 140°F (60°C) and below 200°F (93.3°C) (except any mixture having components with flash points of 200°F (93.3°C) or higher) the total volume of which makes up 99 percent or more of the total volume.
Class IIIB	Liquids have flash points at or above 200°F (93.3°C).

➤ **Safety Cans**

One way to reduce the hazards associated with flammable and combustible liquids is to use safety cans. While safety cans are among the most familiar pieces of safety equipment, they also may be the least understood.

- The basic purpose of a safety can is to provide a convenient means of carrying, dispensing and storing flammable or combustible liquids while controlling flammable vapors from those liquids.
- The official OSHA definition of a safety can, according to 1910.106(a)(29), is, “an approved container, of not more than five gallons capacity, having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.” An approved container is one approved or listed by a nationally recognized testing laboratory, as stated in 1910.106(a)(35).
- In order to meet this definition, a safety can must be leak proof, must automatically vent vapor at approximately five pounds per square inch gauge (psig) of internal pressure, must prevent flames from reaching the liquid contents and must automatically close after filling or pouring is performed.
- In addition to these basic safety requirements, safety cans must be easy to use, properly marked, resistant to damage and wear under typical work conditions and cannot exceed OSHA’s maximum allowable size (see the chart).

Maximum Allowable Safety Can Sizes		
Flammable liquids, Class IA	2 gallons	
Flammable liquids, Class IB	5 gallons	
Flammable liquids, Class IC	5 gallons	
Combustible liquids, Class II	5 gallons	
Combustible liquids, Class III	5 gallons	

- Safety cans are manufactured with metal (galvanized, stainless or terneplated steel) or nonmetallic (polyethylene) bodies. Non-Safety Cans are strictly prohibited for use by TEI employees, subcontractor employees and/or vendors and are to be reported to site supervision for proper removal from use and immediate replacement with an approved Safety Can.
- OSHA standards 1910.144(a)(1)(ii) for liquids having flashpoints below 80°F (26.7°C) require that the safety cans be painted red with clearly visible identification either in the form of a yellow band around the cans or the name of the contents conspicuously stenciled or painted on the cans
- Cap-operating mechanisms on safety cans are spring-loaded and self closing. This feature provides a leak proof seal and allows pressure relief venting. The carrying handle is either attached to or integral with the cap operating mechanism.
- Handle designs affect the convenience of carrying and using the safety can. The best design swings to distribute weight evenly, protects the cap when not in use and enables the safety can to be opened without any awkward second steps.
- Flame arrestor screens inside the cap spout are essential to prevent fire flashback to the can's contents. These are wire or perforated metal inserts. A fire arrestor works because it provides rapid dissipation of heat from fire. Vapor temperature on the inside of the can remains below the ignition point.
- Safety cans must not be filled above their rated capacity, (to the seam that joins a metal can top to the body) or to a fill mark on a nonmetallic can.

➤ **Safety can types**

Type I Safety Cans	Typical single-spout safety cans. The spout is used for both filling and pouring. They are designed for filling containers with large receiving openings, but can also be equipped with funnel hose attachments for filling containers with smaller openings.
Type II Safety Cans	Have a built-in dispensing hose attached to the pouring spout. Because of this, a second opening in the can is required. This second opening serves as a pressure and vacuum relief opening and a filling spout. Both the pouring spout and the filling spout have a flame arrestor. The pouring spout also has an internal dispensing valve. Both the dispensing valve and the fill cap are opened by a single operating mechanism.
Metal Laboratory Cans	Safety cans with self-closing faucets. They are designed for dispensing flammable liquids into smaller containers. They are available in shelf or tilt-rack styles. The shelf dispensing can has a safety faucet near its base for gravity flow dispensing and a top spout for filling and pressure/vacuum relief. Tilt-rack cans are mounted in a sturdy tilt frame with the pouring spout on the top of the can opposite the fill and pressure relief spout.

Portable Fire Extinguisher



- In stored pressure models the expellant gas and extinguishing agent are stored in a single chamber and discharge is directly controlled by the valve
- These units have the advantage of being easily inspected since most are equipped with a pressure gauge indicating that the unit is ready for use.

Maintenance - The best piece of equipment will not operate if it is not recharged and maintained properly. History has proven that nearly every fire extinguisher failure can be traced back to human negligence. To prevent this Fire Extinguishers shall be:

- Visually inspected monthly
- Maintained annually
- Hydrostatically tested periodically

Using A Fire Extinguisher. The P.A.S.S. word is a method for operating most common fire extinguishers. It is a four step method.



Remember... The average hand portable extinguisher will operate for 10 to 30 seconds. There is no time to learn during an emergency.

Fire Prevention (29 CFR 1926.151)

- Internal combustion engine powered equipment shall be so located that the exhausts are well away from combustible materials. When the exhausts are piped to outside the building under construction, a clearance of at least 6 inches shall be maintained between such piping and combustible materials.
- Smoking shall be prohibited at or in the vicinity of operations which constitute a fire hazard, and shall be conspicuously posted "No Smoking or Open Flame".
- Combustible materials shall be piled with due regard to the stability of piles and in no case higher than 20 feet.
- Fuel cans are to be stored 25 feet from an ignition source (i.e., generator, heater).
- Driveways between and around combustible storage piles shall be at least 15 feet wide and maintained free from accumulation of rubbish, equipment, or other articles or materials. Driveways shall be so spaced that a maximum grid system unit of 50 feet by 150 feet is produced.
- Storage of any materials shall not obstruct or adversely affect means of emergency exit.
- All materials shall be stored, handled and piled with due regard to their fire characteristics. Non-compatible materials, which may create a fire hazard, shall be segregated by a barrier having a fire resistance of at least 1 hour.

Temporary Heating Devices

- Heaters not suitable for use on wood floors shall not be set directly upon them or other combustible materials. When such heaters are used, they shall rest on suitable heat insulating material or at least 1-inch concrete, or equivalent. The insulating material shall extend beyond the heater 2 feet or more in all directions.
- Heaters used in the vicinity of combustible tarpaulins, canvas, or similar coverings shall be located at least 10 feet from the coverings. The coverings shall be securely fastened to prevent ignition or upsetting of the heater due to wind action on the covering or other material.
- Solid fuel salamanders are prohibited in buildings and on scaffolds.
- Flammable liquid-fired heaters shall be equipped with a primary safety control to stop the flow of fuel in the event of flame failure. Barometric or gravity oil feed shall not be considered a primary safety control. Heaters designed for barometric or gravity oil feed shall be used only with the integral tanks.
- Heaters specifically designed and approved for use with separate supply tanks may be directly connected for gravity feed, or an automatic pump, from a supply tank.
- Only heaters approved by a nationally recognized testing lab (i.e., UL) or government agency (MSHA) shall be used in construction or industry.

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Origination	Safety Div.	Vice President		08/01/12
01	Clarified that only a state licensed contractor may perform annual inspection and/or replace tag or re-tag a fire extinguisher	Safety Div.	Vice President	03/28/13	04/01/13
02	Under "Commonly Asked Questions" clarified OSHA's stance on the use of live fires as part of fire safety training.	Safety Div.	Vice President	12/28/13	01/31/14
03	No Changes	Safety Div.	Safety Director	07/13/16	07/13/16
04	- Clarified only Approved Metal Safety Cans are permitted for use by any TEI employee, subcontractor and/or vendor. - Required all employees to immediately notify site supervision of the presence and use of any non-metal approved Safety Cans - Added language identifying that our customers may have additional requirements (to NFPA, OSHA, IFCL) for the safe storage of Flammable and Combustible Liquids - Clarified under Q&A on Documented Monthly Inspections that a fire extinguisher is required to have a current and legible tag or it must be removed from service - Updated PASS Method instruction & included R.A.C.E. acronym	Safety Div.	Safety Director	09/30/18	01/18/2020
09/2020	Annual Review – No Changes	N/A	Management w/Safety	N/A	N/A



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262

(330) 686-2300 F (330) 686-2362



-needs to address
emergency eyewashing
equipment being
readily available.

First Aid

Instructions for Creating a
First Aid Plan

2020 - 2021

Purpose

All employees must have access to quick and effective first aid. This guide contains instructions for creating a first aid plan for Thompson Electric, Inc. (*herein referred to as TEI*) employees on TEI-owned sites, TEI-leased space, temporary field locations, and Sub-Contractors that are under the control of TEI operations and management.

Prompt medical attention in case of injury on the job is critical to ensure the health and wellbeing of TEI employees, and sub-contractor employees. This safety policy provides guidelines to determine what first aid requirements are applicable for various operations at Thompson Electric

The TEI Safety Department provides these First Aid Plan Guidelines to accommodate the wide variety of work types, locations, and environments shared by all TEI Divisions, Management and our various classifications of Support Personnel. TEI Management and Division Management can consult these guidelines to determine how many first aid certified employees, if any, they are required to have, and where to obtain what first aid supplies must be stocked.

Employees identified as first aid trained for the purposes of meeting regulatory requirements do so as a collateral duty; it is not their primary job assignment to provide first aid or other medical assistance.

Good Samaritan Act

TEI employees who obtain first aid training as a collateral duty and not as a primary job assignment are covered by the Good Samaritan Statute which states:

“Any person, including but not limited to a volunteer provider of emergency or medical services, who without compensation or the of compensation renders emergency care at the scene of an emergency or who participates in transporting, not for compensation, therefrom an injured person or persons for emergency medical treatment shall not be liable for civil damages resulting from any act or omission in the rendering of such emergency care or in transporting such persons, other than acts or omissions constituting gross negligence or willful or wanton misconduct.”

Roles and Responsibilities

TEI Executive Leadership Team (ELT) has the responsibility to:

- Require the full application and integration of this policy into daily operations, as applicable, in all areas of responsibility and with all direct reports.
- Assess Managers and Supervisory employees on their ability to apply, and enforce, this policy in their areas of responsibility as outlined in this document.

TEI Safety Department has the responsibility to:

- Develop and assist Division Management with technical support in order to implement this policy and first aid requirements.
- Assisting, as needed, with the mandatory Annual review of this policy.
- Helps to interpret the first aid requirements for health and safety, including customer specific first aid requirements.
- In addition, TEI Safety helps to ensure compliance with federal and state first aid regulations through program oversight and provision of services, including information, resources, and assistance with the coordination of training.
- Input of valid training records, as submitted, into our training tracking program(s) for ease of reference by Division Management.
 - Retention of Employee records of training per OSHA and customer guidelines in regards to 1st Aid/CPR and AED training.

TEI Individual Division Manager/Management/Supervisory Responsibilities

- TEI Vice President of Operations specifies that each Division Manager, Project Manager, and supervisor is responsible for the health and safety performance in their respective divisions. This responsibility cannot be transferred or delegated.
- Ensuring the availability of quick and effective first aid and readily accessible first aid supplies in work areas, along with properly trained and certified emergency response personnel when work locations cannot be served by municipal enhanced 911 Emergency Medical Services.
 - Ensuring that specific customer requirements (which may be stricter) are met and maintained.
- Each Division must document their first aid plan, defining their method for meeting the first aid requirements from the options and guidelines included in this document.
- Providing appropriate coaching and corrective action when necessary to ensure this policy is fully integrated into their day to day operations, including the oversight of their subcontractors and subcontractor employees.
- Appendix I is a tool TEI Division Management can use, as a basis, to develop their first aid plan.

All TEI Employees & Subcontractor Employees have the responsibility to:

- Seek care when ill or injured and report all work-related illnesses and injuries to their immediate supervisor. If working with a subcontractor employee, they will similarly report a subcontractor illness or injury.
- Follow all training, instructions and directives relative to this policy.
- Seek clarification whenever there are questions concerning the application of this policy into daily operations.

Annual Review

It is our goal to maintain a First Aid program that is understandable, effective and one that promotes a safe work environment. Any TEI employee can make recommendations for improvement to this program. These suggestions should be directed to any member of management, any Safety Department member or directly to the Vice President of Operations.

As a matter of policy, this program will be reviewed on an annual basis by the Safety Department, Division Management and an assigned Focus Group to determine if all aspects still meet the needs of this organization, our customers, and State and Federal regulations.

If there are significant events that take place during the year that indicate the program is less than effective, an immediate evaluation will be conducted (as described above) and appropriate steps taken to increase the reliability of this program and its related policy.

- These steps will be duly recorded at the end of this policy under “Revision Number” and “Description of Change.”
- TEI will (as required) submit, only as required by our customers, a copy of the revised plan per their guidelines and requirements.

Definitions & Clarifications

The following definitions are to be used only to help clarify words or phrases found in this policy.

- **AED** – Acronym for Automated External Defibrillator. A device that automatically analyzes the heart rhythm and that if it detects a problem that may respond to an electrical shock delivers a shock to restore a normal heart rhythm.
- **ANSI** – Acronym for American National Standards Institute. The term "ANSI standard" means a standard developed by a committee accredited by the American National Standards Institute and in the case of this policy recognized by OSHA.
 - OSHA's published stance on ANSI - "ANSI will furnish assistance and support and continue to encourage the development of national consensus standards for occupational safety and health issues for the use of OSHA and others." This certainly sets the stage for continued integration of OSHA regulations and ANSI standards and cooperation between these two organizations. OSHA's regulatory process will continue to have an impact, and a strong influence, on whether ANSI safety-related consensus standards remain truly "voluntary."
- **CPR** – Acronym for Cardiopulmonary Resuscitation. CPR consists of mouth-to-mouth respiration and chest compression which allows oxygenated blood to circulate to vital organs such as the brain and heart.
- **Emergency** – An unplanned event that could jeopardize the safety of people or property in our facility or on our work sites. An emergency can originate on our site or off-site, and it has an impact on our employees, subcontractor employees or customers.
- **Emergency Medical Treatment** – Treatment by a physician or other licensed health care professional, or treatment using prescription-strength medications. Immunizations besides tetanus, such as hepatitis B or rabies are considered medical treatment.
- **First Aid** – Emergency care provided for injury or sudden illness before emergency medical treatment is available or required.
- **First Aid Injury** – An injury that can be adequately treated using topical wound cleaning, topical medications, ice, heat, nonprescription medications (at nonprescription strength), temporary splinting during transport, simple splinter removal of blister drainage, tetanus immunization, adhesive bandages or wound closures, non-rigid splints, irrigation for a foreign body and the use of eye patches or finger guards.
- **First Aid Kit** – Medical supplies suitable for the provision of basic first aid.
- **First Responder** – Employee who has undergone 1st Aid/CPR/AED training and has been certified (by the accredited provider – Red Cross, American Heart Association, etc.) to provide first aid in the event of a medical emergency.
 - Treatment and supplies can be administered only by designated, trained personnel.
 - If a Co-Worker is trained as a First Responder, it is permissible to provide care using the nearest first aid kit. If untrained or uncomfortable providing care, co-workers should help locate another First Responder on the premises. Co-Workers may consider assisting the Injured/Ill Employee in seeking help or notifying management. When in any doubt, co-workers should contact immediately Emergency Medical Care, a designated First Responder, and their supervisor.
- **Ill Employee** – Any employee who experiences an illness directly linked to a work related exposure.
- **Injured Employee** – Any employee injured on the job.
- **Reporting** – All incidents/illnesses must be reported immediately to Site Supervision, Division Management and TEI Safety, and properly documented on TEI's forms per procedures outlined in TEI SWI #01. This will be the basis to any customer required reporting.
 - Ensure you consult TEI Safe Work Instruction #01 for complete notification and documentation guidelines.

First Aid Response Plan Options

General Information

The minority of TEI employees work in administrative/office environments, while the majority of our employees, and subcontractor employees, work in higher risk settings such as; construction sites, laboratories, medical/clinical settings, skilled trades (ET&D), factories/shops, residential, retail, maintenance, and Fleet.

While these guidelines address the differing first aid needs of these work environments, it also takes into consideration the common elements shared by TEI work areas. The following applies to all TEI work areas:

1. Most TEI work locations are served by municipal enhanced 911 Emergency Medical Services. This must be confirmed when developing site specific First Aid Response Plans.
2. Compliance may be achieved for any type of work environment by having at least one first aid certified employee present when employees are working. A common method of achieving this coverage is for each Division Manager, Project Manager, or Supervisory Person to be trained and certified in first aid.
 - a. It is a TEI requirement that an alternate person also be trained and certified in first aid, to ensure coverage during any planned or unplanned absences.
3. Division Managers must identify, document, and track first aid certified employees. Appendix I is a tool to track this information.
 - a. This responsibility cannot be transferred or delegated.
4. Divisions that have off-site situations (field work), stricter customer requirements, and remote work sites, should have site-specific and situation-specific first aid response plans.
5. Divisions must communicate their first aid plans/requirements to their assigned employees. Including customer specific requirements.
6. Divisions with office work environments, along with TEI administrative staff, can comply with the first aid training requirement by having at least one first aid certified employee per floor of each building, or other defined work area, where the division has offices. For example, a large area of offices may have one first aid trained employee for the area, and can rely on a first aid trained employee in a nearby area (i.e., Warehouse) as a backup. One method for providing adequate coverage is to have Division Managers be first aid trained.
7. Another option for TEI office and customer work sites in metropolitan areas is to rely on the 911 system's emergency services, and when applicable and required, the customer's Security Services for first aid response.
 - a. In cases where this option is used, all employees in the area, or on the work site, must be informed that these 911 services, or customer services, are the primary first aid responders for the them, or their work location, and be trained in how to summon assistance.
8. TEI Shops and Warehouse Operations; In order to ensure that first aid certified employees are available at all times when employees are present, each shop and warehouse location must have at least one first aid certified employee on each shift in each work area. This will likely require having at least two employees trained in order to ensure that at least one is present at all times.
9. Working Alone. When applicable TEI Employees who work alone must know how to summon a first aid certified employee. Project Managers/Supervisors must know the location of all staff working alone and periodically confirm their safety.
10. Remote Locations. When TEI employees, or subcontractor, are stationed in remote locations that are not served by a municipal emergency medical service or customer, there must be a first aid trained employee on-site at all times.

- a. In addition, if TEI employees and subcontractor employees, are assigned to work at remote field locations the Division Management must ensure that there is a written emergency plan for each work site.
 - b. The emergency plan (at a minimum) must include emergency phone numbers, communications capabilities, provisions for transportation of injured or ill employees, and the location of the nearest medical facility.
11. Other Locations. If a TEI employee, or subcontractor employee, has a work environment not addressed in these guidelines, or has a complex mix of work environments or locations, Safety will assist in the development of an employee-specific first aid response plan.
 12. TEI provides company cell phones, wi-fi, boosted cell signals, radios and/or pickup trucks to our foremen which allows for prompt notification and/or transportation to a medical facility.

Levels of Training in First Aid/CPR

- The level of training required for First Aid Providers, at the workplace, will be determined when first aid facilities and services are being planned. The hazard identification and risk assessment process will determine the level of training required.
- To achieve these requirements, TEI shall, as far as is reasonably practicable, provide medical and first aid services such as:
 - Trained & Certified 1st Aid/CPR/AED Providers; Providers (Emergency Responders) are to be trained by the American Red Cross, or equivalent, and shall provide a written certification to management prior to becoming the designated site Emergency Responder.
 - Emergency Responders shall be on site to render emergency services (1st Aid/CPR/AED).
 - Ensure adequate 1st Aid Supplies in accordance with 29 CFR 1910.151; and Emergency/Evacuation procedures for injured person(s).
- In deciding training levels and the number of First Aid Providers required, employees located in isolated areas or mobile workplaces should be taken into account. Arrangements must also be made to cover absences of First Aid Providers from the work site.

Level 1 <i>Basic Workplace 1st Aid, CPR</i>	At this level the First Aid Provider should be able to: ▪ Perform basic emergency 1st Aid, CPR procedures.
Level 2 <i>Workplace 1st Aid, CPR, AED</i>	At this level the 1 st Aid Provider should be able to: ▪ Perform emergency 1st Aid procedures; and undertake the 1st Aid, CPR, AED treatment of injuries and illnesses (i.e., heart attack, fainting).
Level 3 <i>Occupational 1st Aid, CPR, AED</i>	At this level the First Aid Provider should be able to: ▪ Meet the requirements of a Level 2 First Aid Provider; ▪ More effectively deal with first aid problems in the workplace, particularly in an isolated area; ▪ Demonstrate a broad knowledge of the hazards of the working environment, first aid room requirements, techniques of emergency care, and on-site assessment of injured person(s) condition.

Requirements for 1st Aid Supplies

- All 1st Aid Kits shall be inspected before being distributed. All work site employees will have access to 1st Aid supplies. This will be achieved by ensuring each work site/operation is equipped with and inspecting once a week, a minimum of a 1st Aid kit that meets *ANSI Z308.1-2015* requirements (Class A or Class B):

2015 ANSI Class A Minimum Fill Requirements		2015 ANSI Class B Minimum Fill Requirements	
QTY	Item and Minimum Size or Volume	QTY	Item and Minimum Size or Volume
16	Adhesive Bandages, 1" x 3"	50	Adhesive Bandages, 1" x 3"
1	Adhesive Tape, 2.5 yd.	2	Adhesive Tape, 2.5 yd.
10	Antibiotic Treatment, 0.14 fl. oz. (0.5g) applications	25	Antibiotic Treatment, 0.14 fl. oz. (0.5g) applications
10	Antiseptic, 0.14 fl. oz. (0.5g) applications	50	Antiseptic, 0.14 fl. oz. (0.5g) applications
1	Breathing Barrier	1	Breathing Barrier
1	Burn Dressing, 4" x 4"	2	Burn Dressing, 4" x 4"
10	Burn Treatment, 1/32 oz. (0.9g) applications	25	Burn Treatment, 1/32 oz. (0.9g) applications
1	Cold Pack, 4" x 5"	2	Cold Pack, 4" x 5"
2	Eye Coverings	2	Eye Coverings
1	Eye Wash, 1 oz.	1	Eye Wash, 4 oz.
1	First Aid Guide	1	First Aid Guide
6	Hand Sanitizer, 1/32 oz. (0.9g) applications	10	Hand Sanitizer, 1/32 oz. (0.9g) applications
4	Medical Exam Gloves	8	Medical Exam Gloves
1	Roller Bandage, 2" x 4 yd.	2	Roller Bandage, 2" x 4 yd.
1	Scissors	1	Roller Bandage, 4" x 4 yd.
2	Sterile Pads, 3" x 3"	1	Scissors
2	Trauma Pads, 5" x 9"	1	Padded Splint, 4" x 24"
1	Triangular Bandage, 40" x 40" x 56"	4	Sterile Pads, 3" x 3"
		1	Tourniquet, 1"
		4	Trauma Pads, 5" x 9"
		2	Triangular Bandage, 40" x 40" x 56"

- In addition to 1st Aid supplies, TEI Division/Project/Site management will ensure that an adequate number of their divisions field employees are trained in 1st Aid/CPR/AED. This number will be determined by size of work site crew, scheduled employee vacations, FmLA leave, etc...
- As far as is practicable, first aid boxes shall be provided and located to ensure:
 - That they are readily accessible to all employees; Unlocked, but securely closed, Dust & Moisture proof;
 - That the name(s) and contact number(s) of First Aid Providers are provided on or near the box; Inspected monthly, and under the control of a trained 1st Aid Emergency Responder;
 - Additional information, such as name, address and phone number of the nearest medical or emergency services, are supplied on or near the box. (This information will be provided and maintained by the Site's Supervisory Personnel and/or the designated First Aid Providers).

 Documentation of 1st Aid Plan	Date:	Division:		
	Worksite:			
Instructions: Use this form to create and document the 1 st Aid plan for your work location, department, subcontractor, or TEI Customer.				
☐ Office ☐ Shop/Warehouse ☐ Remote Location ☐ Work Site/Customer ☐ Other (Describe):				
_____ (Insert Name) has chosen, and authorized, the following as our plan to provide quick and effective 1 st Aid/Emergency Responder services to our employees as listed above. Complete the following as they apply:				
☐	We will rely on local Emergency Services, and the local Fire Department to provide 1 st Aid/CPR/AED responses at this location (<i>i.e., Worksite</i>).			
☐	We will ensure that 1 st Aid/CPR/AED trained personnel are available to render 1 st Aid/CPR/AED services to our employees. The following employees have received, are current in training, and certified by their accredited provider (Red Cross, Heart Association, National Safety Council, etc.) for this location:			
	Name of Provider	Phone Number	Date(s) of last Training	
			1 st Aid	CPR
☐	We have a specialized procedure for ensuring quick and effective 1 st Aid Services to our employees. (<i>Describe below</i>):			
This plan was last updated and authorized: On (insert date): _____ By: _____				
For questions regarding this plan, contact: Name: _____ Phone: _____				

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Origination	Safety Div.	Vice President		08/01/12
01	Updated First Aid Kit Requirements to Include Burn Module	Safety Div.	Vice President	12/28/12	01/31/13
02	Revised Emergency Contact Numbers Section to Mirror Project Specific Safety Plan Guidelines & Requirements	Safety Div.	Vice President	05/15/13	01/31/14
03	- Replaced "Introduction" with the "Purpose" of TEI's 1st Aid Guideline Policy – Clarification - Inserted definition of the "Good Samaritan Act" - Revised Roles & Responsibilities - Revised Annual Review Requirements - Added definitions to clarify words and phrases found throughout the policy - Added First Aid Plan Options to adequately address all divisions & employees of TEI - Revised First Aid Kit Content Requirements to reflect the Class "A" and Class "B" ANSI Z308.1 recommended minimum first aid kit requirements - Added a form for "Documentation of 1st Aid Plan"	Safety Div.	Management w/Safety	09/2020	09/2020



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362



Powered Industrial Trucks

Class I thru Class VII Forklifts

Requirements & Guidelines

2020 - 2021

Introduction

Powered industrial trucks are rugged vehicles that save time, money and effort. For the purposes of this program a “Powered Industrial Truck” (PIT) is defined as a mobile, power-driven vehicle used to carry, push, pull, lift, stack, or tier materials, whether ridden or controlled by an operator. A “Rough Terrain Forklift Truck” means a mobile, power driven vehicle used to carry, push, pull, lift, stack, or tier material. At TEI this would include but not be limited to:

- ❑ Forklifts;
- ❑ Pallet Trucks;
- ❑ Platform Lift Trucks;
- ❑ Motorized Hand Trucks;
- ❑ Other specialized industrial trucks, powered by electric motors or internal combustion engines.

Vehicles that are not considered to be Powered Industrial Trucks by TEI include the following:

- ❑ Manual Pallet Jacks;
- ❑ Compressed Air or Nonflammable Compressed-Gas-Operated Industrial Trucks;
- ❑ Farm Vehicles;
- ❑ Vehicles intended primarily for earth moving or over-the-road hauling.

The use of safety and protective devices is an important factor in safe design and operation of PIT’s. Therefore, all Powered Industrial Trucks rented or purchased by Thompson Electric, Inc. (*herein referred to as TEI*) or utilized by a subcontractor on a “Company” controlled job/work site, must be designed, constructed and tested so as to be in compliance with ANSI (American National Standards Institute) B56 series standard. At a minimum this would include:

- ❑ Nameplate(s) and marking (i.e., capacity information, limitations);
- ❑ Warning Devices (i.e., lights or blinkers, sound-producing devices, motion alarms);
- ❑ Overhead Guards (required when a falling-object hazard exists for the operator);
- ❑ On-board, sealed fire extinguishers (i.e., ABC rated fire extinguisher).

Policy

This policy and procedures is a key document to assist our firm in implementing and ensuring compliance with the standard, thereby protecting our employees, and in turn the general public. This Powered Industrial Truck policy includes, but is not limited to:

- ❑ Training and Inspecting the Vehicle;
- ❑ Refueling/Recharging Guidelines;
- ❑ Safe Operating Procedures;
- ❑ Parking;
- ❑ Lifting Capacity & Procedures;
- ❑ The Stability Triangle;
- ❑ Slopes, Ramps & Other Hazards;
- ❑ Unloading Procedures; and
- ❑ Road Use of PIT’s

All workers must comply with the requirements set forth in this document. Any deviation from these requirements will require direct written approval from Division Management and the Safety Director.

At Thompson Electric only trained and duly certified personnel may operate any class of Powered Industrial Truck.

Definitions

Accident Investigation – An investigation of an accident involving a PIT in order to determine the facts that caused or may have caused the accident and; recommendations for appropriate action to prevent a similar accident from occurring.

Attachments – Devices (other than conventional forks or load backrest extensions) for a specific use, mounted permanently or temporarily on the elevating mechanism of the PIT. Common types include fork extensions, clamps, booms, rams, baskets, and personnel platforms. These devices may be commercially available equipment, or equipment that has been fabricated onsite.

Capacity – Used to designate the weight-handling ability of a particular PIT as equipped.

Center of Gravity – The point on an object at which all of the object's weight is concentrated. For symmetrical loads, the center of gravity is at the middle of the load.

Certification – Certification requirements include successful training in the fundamentals and operation of the Powered Industrial Truck and; evaluation of sufficient skills for safe operation upon completion of Supervised Hands-On training. Both criteria must be met before qualification to operate the PIT without supervision. Documentation of the operator's training and evaluation dates, including the trainer's name, must be maintained in the operator's personnel file.

Counterweight – The weight that is built into the truck's basic structure and is used to offset the load's weight and to maximize the vehicle's resistance to tipping over.

Dockboard – A portable or fixed device for spanning the gap or compensating for the differences in the height between the loading platform and carrier.

Environment – Locations classified as hazardous or non-hazardous when considering the type of PIT required (See Table A-1 through A-4):

Table A-1. Hazard Classifications.

Classes	Unclassified	Class I Locations	Class II Locations	Class III Locations
Description of classes	Locations not possessing environment described in other columns.	Locations in which flammable gases or vapors are (or may be) present in the air in quantities sufficient to produce explosive or ignitable mixtures.	Locations that are hazardous because of the presence of combustible dust.	Locations in which easily ignitable fibers are present, but are not likely to be in suspension in quantities sufficient to produce ignitable mixtures.

Table A-2. Hazardous Atmospheres.

Group within classes	None*	A	B	C	D	E	F	G	None
Examples of locations or environment in classes and groups	Piers and wharves inside and outside, general storage, general industrial or commercial properties	Acetylene	Hydrogen	Ethyl Ether	Gasoline, Naphtha, Alcohol, Acetone, Lacquer, Solvent, and Benzene	Metal Dust	Carbon, black; coal and coal dust	Grain dust, flour dust, starch dust, and organic dust	Baled waste, cocoa fiber, cotton, excelsior, hemp, istle, jute, kapok, oakum, sisal, Spanish moss, and synthetic fibers
* None - Not classified in other groups									

Table A-3. Divisions within Groups

		1	2	1	2	1	2
Divisions (nature of hazardous condition)	None	Above condition exists continuously, intermittently, or periodically under normal operating conditions.	Above condition may occur accidentally as due to a puncture of a storage drum.	Explosive mixture may be present under normal operating conditions, or where failure of equipment may cause the condition to exist simultaneously with arcing or sparking of electrical equipment, or where dusts of an electrically conducting nature may be present.	Explosive mixture not normally present, but where deposits of dust may cause heat rise in electrical equipment, or where such deposits may be ignited by arcs or sparks from electrical equipment.	Locations in which easily ignitable fibers or materials producing combustible "flyings" are handled, manufactured, or used.	Locations in which easily ignitable fibers are stored or handled (except in the process of manufacture).

Table A-4. Authorized uses of PITs by type in groups of classes and divisions.

Groups in Classes	None**	A	B	C	D	A	B	C	D	E	F	G	E	F	G	None	None
Type of PIT Authorized:																	
Diesel:																	
Type D	D*																
Type DS									DS						DS		DS
Type DY									DY						DY	DY	DY
Electric:																	
Type E	E*																E
Type ES									ES						ES		ES
Type EE									EE						EE	EE	EE
Type EX					EX				EX		EX	EX			EX	EX	EX
Gasoline:																	
Type G	G*																
Type GS									GS						GS		GS
LP-Gas:																	
Type LP	LP*																
Type LPS									LPS						LPS		LPS
* PITs conforming to these types may also be used																	
** None - Not classified in other groups																	

Forklift Truck – A self-loading PIT equipped with load carriage and forks for transporting and tiering loads.

Forks – Horizontal, tine-like projections, normally suspended from the carriage that engage and support loads.

Fulcrum – the truck's axis of rotation when it tips over.

Grade – the slope of a surface, which is usually measured as the number of feet of rise or fall over a hundred foot horizontal distance (the slope is expressed as a percent).

Lateral Stability – A truck's resistance to overturning sideways.

Line of Action – An imaginary vertical line through an object's center of gravity.

Load Center – The horizontal distance from the load's edge (or the fork's or other attachment's vertical face) to the line of action through the load's center of gravity.

Longitudinal Stability – The truck's resistance to overturning forward or rearward.

Moment – The product of the object's weight times the distance from a fixed point (usually the fulcrum). In the case of a powered industrial truck, the distance is measured from the point at which the truck will tip over to the object's line of action. The distance is always measured perpendicular to the line of action.

Operator – A trained and authorized person who controls any function(s) of a PIT.

Powered Industrial Truck – Any mobile power-propelled (i.e., electric or fuel) truck used to carry, push, pull, lift, stack or tier materials. PIT's can be ridden or controlled by a walking operator.

Tiering – The process of placing one load on or above another.

Track – The distance between the centerline of the vehicle's front and rear wheels.

Wheelbase – The distance between the centerline of the vehicle's front and rear wheels.

Responsibilities

Division Management or Safety shall be responsible for the following:

- ❑ Annual review and update of TEI's Powered Industrial Truck Program (*i.e., Forklift*) to conform to current CFR standards.
- ❑ Ensuring that licensing requirements and standard operating procedures, described in this supplement, are included in specifications and contract documentation for work to be performed by subcontractors.
- ❑ Analyze accidents involving PIT's as appropriate.
- ❑ Assists, when necessary, in selection and designation of jobs and/or job sites, which require the use of Powered Industrial Trucks.
- ❑ Coordinates with the Supervisor, training programs for use and operation of PIT's.
- ❑ Ensure that a qualified (according to the training outline of this policy and procedure) "designated and approved" (experienced and knowledgeable) PIT operator/instructor provides practical application training and performance evaluations to potential operators.
- ❑ Maintain training records of operator training and licensing.

Supervisor (Field Management) shall be responsible for the following:

- ❑ Select operators based on their experience and physical qualification.
- ❑ Assure that personnel, under their direct supervision, have successfully completed the required training courses.
- ❑ Ensure that PIT operators under their direct supervision have a valid TEI operator's license.
- ❑ Monitor the performance of PIT operators to ensure they comply with safety rules.
- ❑ Ensure that unauthorized persons do not operate PIT's under their direct control.
- ❑ Monitor daily shift pre-operational inspections.
 - Maintain completed Pre-operational Inspection Checklists for a period of 30 days.
 - Periodically and routinely inspects vehicles and vehicle operations.
 - Ensure that PIT's, which are out of compliance, are red tagged, reported to the Fleet Manager and not operated.

Operators shall be responsible for the following:

- ❑ Receive hands-on training and a performance evaluation from a "designated and approved" (experienced and knowledgeable) PIT operator/instructor prior to operating any powered industrial truck.
- ❑ Have a TEI Operator's Certification on file or readily available in the field.

- ❑ Operates equipment safely and in accordance to operating instructions
- ❑ Wears appropriate protective equipment at all times.
- ❑ Conducts and documents pre-operational inspections, utilizing the Pre-operational Inspection Checklist.
- ❑ Reports any defects or malfunctions to site Supervisor immediately. Does not use a malfunctioning vehicle if the defect impairs the safe operation or use of the vehicle.
- ❑ Notifies their immediate Supervisor if they are unfamiliar with or believe a load is not safe to lift, or if they believe an environment is not safe to enter.
- ❑ Informs their immediate Supervisor of any safety-related problems involving PIT's or operations

Training

A key element of operator certification is the education and training received. All PIT Training is provided by a Qualified/Competent Instructor and must be approved by the Safety Department Manager.

Regardless of previous experience, all operators must be trained and authorized by TEI, as outlined in this policy and procedure, before operating powered industrial trucks at TEI or on any TEI controlled worksite. Training programs shall include formal instruction, practical training and a workplace specific operator hands-on evaluation.

TEI's training includes:

▪ Operating instructions, warnings & precautions.	▪ Controls and instrumentation.
▪ Engine operation.	▪ Steering, maneuvering and visibility.
▪ Fork and attachment operation.	▪ Vehicle capacity and stability.
▪ Inspection and maintenance procedures.	▪ Refueling or charging of batteries.
▪ Operating Limitations.	▪ Composition of loads and load stability.
▪ Surface conditions where the vehicle will be operated.	▪ Differences between a powered industrial truck and an automobile.
▪ Load manipulation and stacking.	▪ Pedestrian traffic.
▪ Narrow aisles and ramps.	▪ OSHA regulations
▪ Hazardous locations and environments that could cause a buildup of carbon monoxide or exhaust fumes	▪ Any other operating instructions, warning, or precautions listed in the operator's manual for the type of vehicles they are being trained to operate.
▪ Surface conditions where the vehicle will be operated.	▪ Composition of loads to be carried and load stability
▪ Load manipulation, stacking, and unstacking.	▪ Pedestrian traffic in areas where the vehicle will be operated.
▪ Narrow aisles and other restricted places where the vehicle will be operated.	▪ Hazardous (classified) locations where the vehicle will be operated.
▪ Ramps and other sloped surfaces that could affect the vehicle's stability.	▪ Unique potentially hazardous environmental conditions in the workplace that could affect safe operation (i.e., overhead power lines).

To become a PIT operator and receive a PIT operator's license, candidates must successfully complete:

❑ **Formal Instruction:**

- Video;
- Lecture;
- Practical Hands-On Evaluation
- Question and answer session.
- Oral and/or written tests shall be given by TEI's "designated and approved" (experienced and knowledgeable) PIT operator/instructor, to measure the skill and knowledge of the operator in meeting the requirements of the Standard. Operators shall score 70% on the oral and/or written tests.
 - Records will be maintained by TEI at 49 Northmoreland, Munroe Falls, Ohio.

❑ **Practical Application (Hands-On Training):**

- Candidates shall successfully complete practical application (hands-on) training for equipment they operate in the workplace. The Company designated PIT operator/instructor shall administer this instruction according to the guidelines established by this policy and procedure.
- The length of this required training varies, depending upon the level of skill, knowledge, and experience of the candidate.
- After beginning training, the candidate has three (3) months to successfully complete the hands-on training and performance evaluation, prior to the issuance of a TEI operator's license.
 - If more than three (3) months elapses after beginning training, the candidate is required to retake the Formal Instruction and begin the process all over again.
 - During the practical application (hands-on training) phase, the candidate may not operate a PIT unless he/she is working under the direct supervision and training of a Company designated PIT operator/instructor.

❑ **Hands-On "Practical" Performance Evaluation:**

- Upon successful completion of the Formal and Hands-On training, the candidate is eligible for a performance evaluation by the Company designated Trainer/Qualified Operator. This evaluation determines how safely the candidate operates PIT's in the work environment.
- Upon successful completion of the performance evaluation, the Company designated PIT operator/instructor will forward the Powered Industrial Truck Operator Safety Guide Checklist to the Division Management or Safety Director (or his designated representative). A license will then be issued for the appropriate PIT classification.

Class	Powered Industrial Truck Type
I	Electric Motor Rider Trucks
II	Electric Motor Narrow Aisle Trucks
III	Electric Motor Hand Trucks or Hand/Rider Trucks
IV	Internal Combustion Engine Trucks (Solid/Cushion Tires)
V	Internal Combustion Engine Trucks (Pneumatic Tires)
VI	Electric and Internal Combustion Engine Tractors
VII	Rough Terrain Lift Trucks

- If the PIT operator or his/her immediate Supervisor wants to have additional equipment (i.e., newly purchased PIT's or other) added on an operator's license, a new Powered Industrial Truck Operator Safety Guide Checklist must be completed and sent to the Division Management or Safety Director (or his/or her designated representative).
 - This checklist should provide evidence that the operator has received training and has been evaluated on this new equipment by the Company designated PIT operator/instructor. After review, the operator's license will be updated accordingly.

❑ **Refresher/Retraining and Enforcement:**

- Appropriate refresher/retraining will be provided by a Company designated PIT operator/instructor when:
 - Driver operates the truck in an unsafe manner;
 - Driver is involved in an accident or near-miss incident;
 - Driver is assigned to drive a different type of powered industrial truck; or
 - Conditions in the workplace changes in a manner that could affect the safe operation of the truck.
- **Refresher/Retraining in safety procedures and OSHA regulations will be conducted by a Company designated Qualified PIT operator/instructor, at a minimum, *every three (3) years*.**
- An evaluation of driver performance will be conducted by a Company designated Qualified PIT operator/instructor, at a minimum, *every three (3) years*.
- Any operator failing any aspect of the retraining is required to retake the Formal Instruction and begin the process all over again.
- Operators, regardless of status, who do not comply with TEI's Powered Industrial Truck Policy and Procedure, will be treated in accordance with TEI's Disciplinary Action Procedures.

❑ **Training Records:**

- A record of training and skill evaluations shall be kept on file and made available upon request. Division Management and Safety are responsible for maintaining and archiving training records in accordance with TEI's Powered Industrial Truck Policy and Procedures.

Mandatory Equipment

The use of safety and protective devices is an important factor in safe design and operation of PITs. The design of PITs shall comply with the appropriate American National Standards Institute (ANSI) B56 series standard.

- ❑ All Powered Industrial Trucks, utilized at TEI or on a TEI worksite, must be minimally equipped with the following:
 - Legible nameplate(s) and markings (i.e., capacity information, limitations).
 - Horns or other warning devices that are loud enough to be heard above other noises in the area. Flashing lights shall be placed on the overhead guard if noise is excessive. Forklifts should have automatic backup alarms.
 - Auxiliary lighting shall be provided on the truck in areas where general lighting is less than two lumens per square foot.
 - A load backrest extension shall be used whenever necessary to minimize the possibility of the load falling backwards.
 - The load should not exceed the top of the backrest. Placing extra weight on the rear of the lift truck to counterbalance the front load *is not permitted*.

- Trucks capable of lifting loads higher than the operator's head or where there is a hazard from falling objects must be equipped with an overhead guard. The guard is not designed to protect the operator from a full capacity load.
- Hazardous moving parts such as gears, chains, and sprockets shall be guarded.
- Seat belts are required to be worn, if installed on the vehicle.
- On-board, sealed fired extinguisher (ABC).
- Additional equipment may be mandated for certain hazardous environments.

PIT Area of Use (Hazard Classification)

In addition to the classification (Class I through VII), PIT's are designated for use in different environments, depending on how they are powered and safeguarded to mitigate hazards caused by exhaust, fuel, and electrical systems. Table 5 illustrates the eleven (11) designations for PITs, which are divided according to their locations of use (non-hazardous and hazardous).

Table 5

Nonhazardous Locations	
Type	Description
D Trucks	Diesel powered units having minimum acceptable safeguards against inherent fire hazards.
E Trucks	Electrically powered units having minimum acceptable safeguards against inherent fire and electrical shock hazards.
G Trucks	Gasoline powered units having minimum acceptable safeguards against inherent fire hazards.
LP Trucks	Liquefied petroleum gas-powered units having minimum acceptable safeguards against inherent fire hazards.
Hazardous Locations	
Type	Description
DS Trucks	Diesel powered units that are provided with all the requirements for type D units and that have additional safeguards for the exhaust, fuel, and electrical systems.
DY Trucks	Diesel powered units that have all the safeguards of type DS units except that they do not have any electrical equipment, including ignition. These trucks are equipped with temperature limitation features.
ES Trucks	Electrically powered units that are provided with all the requirements for type E units and have additional safeguards for the electrical system to prevent emission of hazardous sparks and to limit surface temperatures.
EE Trucks	Electrically powered units that are provided with all the requirements for types E and ES units and have electrical motors and all other electrical equipment completely enclosed.
EX Trucks	Electrically powered units that differ from type E, ES, or EE units in that the electrical fittings and equipment are designed, constructed, and assembled so that the units may be used in atmospheres containing specifically named flammable vapors, dusts, and under certain conditions, fibers. Type EX units are specifically tested and classified for use in Class I, Group D or for Class II, Group G locations as defined in NFPA 70 (National Electrical Code).
GS Trucks	Gasoline powered units that, in addition to all the requirements for type G units, are provided with additional safeguards to the exhaust, fuel, and electrical systems.
LPS Trucks	Liquefied petroleum gas powered units that, in addition to the requirements for type LP units, are provided with additional safeguards for the exhaust, fuel, and electrical systems.
Durable markers indicating the designation of the type or PIT for use in hazardous areas shall be applied to each side of the vehicle in a visible but protected area. In addition, the words "Explosives Approved" shall be stenciled in plain view on all PITs approved for use with explosives.	

Hazardous Area Signs. Where applicable, the entrance to hazardous areas shall be clearly identified and posted with a sign identifying the type of PIT permitted, or the PIT shall be clearly marked indicating the area (s) it shall enter.

Inspecting the Vehicle

A daily check must be performed of each powered industrial truck at the start of each shift. If the forklift is used on a round-the-clock basis they shall be examined after each shift. It is recommended that a written record of vehicle inspections and repairs be kept.

What to Check For & Report

Each shift, **prior** to starting the powered industrial truck, check the following:

☒ Brakes	☒ Steering	☒ Oil Level	☒ Water Level
☒ Tires	☒ Hydraulics	☒ Fuel level/Battery Charge	☒ Instrument Controls

Then **after starting the PIT** check:

☒ Warning Lights	☒ Brakes – Both Service & Parking
☒ Gauges	☒ Hydraulic Control Operations
☒ Horn	☒ Lift & Tilt Operations
☒ Headlights	☒ Load Engaging Means

The PIT is **unsafe** to Operate and must be red tagged and reported to the TEI Fleet Manager if...

- ☐ Service/Parking Brakes do not perform;
- ☐ Fuel system leaks;
- ☐ Excessive lift, drift, or tilt of cylinders or forks;
- ☐ Excessive free play in steering;
- ☐ Excessive hydraulic leaks.

If mechanical failure occurs the operator is to stop and secure the vehicle, contact their Supervisor immediately to red tag the vehicle, notify the TEI Fleet Manager and arrange the necessary repairs.

- Repairs or adjustments are to be made by authorized personnel only.

Refueling/Recharging

Refuel only in designated “Refueling Areas”. No Smoking or other source of ignition allowed within 25 feet when refueling.

- ☐ When changing propane (LPG) cylinders:
 - Wear eye protection and leather gloves.
 - Close the valve on the cylinder.
 - Run the engine until it stops. This ensures that the connection hose is empty.
 - Shut off the engine.

- Open the connecting nut and inspect valves for leaking. **DO NOT use metal tools.**
- Disconnect the hose.
- Disconnect the holding straps.
- Remove the empty cylinder.
 - Put cylinder down gently. Do not drop, dent, damage;
 - Always protect the valve from any damage;
 - Avoid contact with liquid propane, as it causes frostbite
 - Exchange removable cylinders outdoors or in well-ventilated areas.
 - Store cylinder outside, in an upright position, in an area where it can be secured and is protected from being struck.
- Replace the full cylinder in the proper position.
- Connect the holding straps.
- Tighten the connecting nut (wiggle hose).
- Open the valve on the cylinder slowly and check for leaks. Use solution of soap and water or a leak detector to check – Smell – listen – look.
- If the valve leaks:
 - 1st time – Tighten the nut and continue;
 - 2nd time – Change the cylinder;
 - 3rd time – Change the hose.
- Open the valve fully (slowly).
- Check that the hose is turned inward.
- Secure the hose downward.
- Secure the cylinder.
- Start the engine and resume operation.
- Never mount more than two LPG cylinders on any forklift truck.

When changing batteries:

- Personal Protective Equipment required for changing batteries:
 - ◆ Goggles or Face Shield ◆ Chemical Resistant Gloves ◆ Chemical Resistant Apron
- Only authorized employee(s) can change or charge a battery. This should be done only in a designated battery charging area.
- No smoking or sources of ignition near the battery or in the battery charging area.
- Check the electrolyte level before recharging. If the battery has been outside in cold weather, make sure that the battery is not frozen before recharging it.
- If the electrolyte is covering the top of the plates, do not add more water. Recheck the fluid level after the battery has been recharged. If water is added, use distilled water, not tap water.
- When vent plugs may need adjustment, follow manufacturers' instructions carefully.
- If the battery has sealed vents, do not recharge the battery with a current greater than 25 amps.
- To reduce the possibility of explosions, follow the recommendations of the recharger manufacturer for attaching and removing cables and for operating the equipment properly. Generally, this includes unplugging or turning off the charger before connecting or disconnecting the clamp connections. Carefully attach the clamps to the battery with the proper polarity [positive (+) clamp, usually red, to the positive terminal and negative (-) clamp, usually black, to the negative terminal].
- Ensure that area is ventilated when the batteries are being charged.

- Charge batteries only in approved, ventilated battery-charging areas. The charging of lead-acid batteries can be hazardous. When batteries are being recharged, they generate hydrogen gas that is explosive in certain concentrations in air (the flammability or explosive limits are 4.1% to 72% hydrogen in air). The spark retarding vents helps slow the rate of the release of hydrogen, but the escaping hydrogen may form an explosive atmosphere around the battery if ventilation is poor. The ventilation system should be designed to provide an adequate amount of fresh air for the number of batteries being charged. This is essential to prevent an explosion.
- Install a safety shower and an eyewash station in a battery-charging area.
- If the battery becomes hot or if the electrolyte spits out from the vent, turn off the recharger temporarily. Resume recharging using a lower current or charging rate.

Safe Operating Procedures

These requirements apply to all PIT operators:

- ❑ Use a “three-point mount” to enter and exit the PIT by always keeping at least two hands and one foot or two feet and one hand in contact with the PIT at all times.
- ❑ Use seat belts where provided
- ❑ Operate internal combustion engine PITs only in designated areas with adequate ventilation.
- ❑ Do not exceed the floor load rating. (Remember that the total weight of the PIT equals the PIT’s plus the load and any attachments.)
- ❑ Do not add extra weight to counterbalance an overload.
- ❑ Secure (tie down) unstable loads before starting the vehicle.
- ❑ Keep arms and legs inside the PIT structure, except when signaling for turns or stops.
- ❑ Do not jump from a moving PIT.
- ❑ Make sure that there is adequate clearance before passing under or between structures.
- ❑ Maintain indoor speed under 5 mph and outdoor speed under 15 mph.
- ❑ Yield to pedestrians.
- ❑ Do not carry passengers, except where **manufacturer approved** seats are provided.
- ❑ Tilt the mast back before traveling.
- ❑ Stay at least three (3) vehicle lengths back when following another PIT.
- ❑ Maintain forks about 4 to 6 inches off the driving surface when traveling.
- ❑ Do not attach slings, cables, or chains to the forks to lift materials or objects from underneath them.
- ❑ When forward vision is obscured, drive in reverse.
- ❑ Observe all traffic signals.
- ❑ Do not use a PIT to tow or push other PITs, another vehicle, or other equipment, unless it is specifically designed to do so.
- ❑ Use Class VII PITs for irregular or rough terrain.
- ❑ When traveling on streets or roads, only use PITs that have been recommended by the manufacturer for actual road use.
- ❑ Solid tire PITs (such as Class IV PIT) should be used indoors only. Solid tire PITs are not designed to operate on irregular surfaces or rough roads.
- ❑ Place tines as wide as possible for the load and lock them in place to prevent sideways movement.
- ❑ Never add a counterweight. Know the weight of the load being lifted.

- ❑ Never exceed the PITs rated capacity.
- ❑ Do not lift material or equipment with which you are unfamiliar.
- ❑ Maintain at least a 10 foot separation from overhead power lines.
- ❑ When crossing irregular areas, slow down and approach on a diagonal.

Parking the Powered Industrial Truck

The requirements below apply when parking Powered Industrial Trucks.

- ❑ Park on level surfaces.
- ❑ Lower the forks to the ground.
- ❑ Tilt the mast forward.
- ❑ Set the parking brake.
- ❑ Place the controls in the neutral position.
- ❑ Turn off the engine.
- ❑ Chock the wheels if the PIT must be parked on a slope.
- ❑ Do not leave an unattended PIT running. A PIT is considered unattended if the operator is out of sight of the PIT or more than 25 feet away. If you must leave your truck unattended....
 - Forks flat to floor or ground;
 - Controls neutralized;
 - Brakes set;
 - Power off;
 - If on incline – wheels blocked, steering wheel turned.
- ❑ Do not park in front of stair wells, exits or fire hydrants that may be needed in an emergency.

Special Racks

- ❑ Carry all parts of materials in approved containers only.
- ❑ Barrels and drums in special racks only.
- ❑ Oxygen, acetylene and other gas cylinders – upright fastened – safety caps tight and in approved racks only.

Lifting Capacity

- ❑ PITs have special handling requirements. One reason for this is their tremendous lifting capacity.
- ❑ The counter balance weight in the back of a PIT prevents the PIT from tipping over when you lift a load.
- ❑ As the load's center of gravity moves further away from the mast, the PIT's lifting capacity will be reduced.
- ❑ Check the PIT's nameplate to see what its lifting capacity is. Always use a forklift that is rated to handle the weight of the load you want to move.

Lifting Procedures

- ❑ Never exceed the recommended load limit of the PIT. Each PIT has a maximum load limit. The load limit is shown on the data plate of the PIT.
- ❑ If you are working with pallets, space the forks as widely as possible to better balance the load. Keep the forks level and a few inches off the ground and then push them slowly into the pallet.
- ❑ Once the forks are fully inserted, slowly lift the pallet about six (6) inches off the ground. Tilt the mast back to secure the load for transport.
- ❑ Loads that are naturally off-center should be stabilized before they are moved.

- ❑ Special attachments can be used for moving barrels and other hard to lift objects. Ask your Supervisor about the attachment that's right for the job you are performing.
- ❑ Always remove damaged pallets from service.
- ❑ When raising the load;
 - Check that the overhead clearance is adequate before raising loads.
 - Do not raise or lower the fork unless the lift truck is stopped and braked.
 - Lift loads straight up or tilt back slightly.
 - Do not lift a load that extends above the load backrest unless no part of the load can possibly slide back toward the operator.
 - Attend the controls of the PIT when a load is elevated. In other words, the operator must stay on the PIT when the load is in a raised position.

The Stability Triangle

- ❑ The "Stability Triangle" consists of the three (3) support points. The first point is at the center of the rear axle while the second and third points are the front wheels.
- ❑ A PIT's center of gravity falls toward the back of the Stability Triangle when it is not carrying anything.
- ❑ When lifting and carrying an object on the forks, the center of gravity of the PIT, and its load, will shift toward the front of the PIT.
- ❑ The PIT's center of gravity can also shift out of the Stability Triangle if an object is not pushed all the way back onto its forks or if it is too heavy for the PIT to carry.
 - This can cause the PIT to shift forward, the steering could become hard to control, you could lose the load, or the PIT could be damaged.
- ❑ The "Vertical Stability Line" or "Line of Action" is an imaginary vertical line that runs through the PIT's center of gravity.
- ❑ If the Line of Action falls within the Stability Triangle, the PIT will be stable.
- ❑ Factors that may shift the Line of Action outside the Stability Triangle include:
 - Placement of the load on the forks;
 - How high the load is raised; and
 - The angle of the floor underneath the forklift.
- ❑ If for any reason the PIT begins to tip, do not jump out. You should brace your feet, grab the steering wheel and pull yourself against it.

Slopes, Ramps & Other Hazards

- ❑ Because most PITs have rear-wheel steering, be careful going around corners and driving on loading docks.
- ❑ Cross curbs and railroad tracks at an angle so that two of the three stability points stay in contact with the ground.
- ❑ When transporting a load, keep the forks and load uphill. Back down all slopes.
- ❑ If you aren't carrying a load, keep the forks pointed downhill. This will keep the PIT balanced and help prevent the PIT from tipping.
- ❑ If you travel off of a ramp with a load that blocks your view, have a spotter assist you.
- ❑ Always make sure the ramp will support the weight of the PIT and the load.
- ❑ Clear any obstacles in your path and check the ramp for puddles, ice or snow.
- ❑ Watch your speed on ramps and other inclines. Be sure not to let the PIT accelerate if you are maneuvering down an incline.
- ❑ Never travel across a slope at an angle.

- ❑ Make sure the railcar, truck or trailer brakes are set and block the wheels. When working on trailers, check the strength of the flooring before you drive into them.

Loading/Unloading Procedures Once you have reached your destination, it is important to follow correct procedures for loading/unloading.

- ❑ Verify trailer or truck chocks, supports, and dock plates prior to loading/unloading
- ❑ Push straight ahead until the object is a few inches short of the drop-off point.
- ❑ Tilt the mast forward so the forks are parallel to the floor and the load is directly over the drop-off point.
- ❑ Gradually lower the forks until the load is in place and the forks move freely.
- ❑ When you back away, do it slowly. Try to keep from dragging the forks across the floor.
- ❑ If you handle materials that are placed in pallet racks or stacked, ask your Supervisor how high you can safely stack the cargo you are unloading or positioning.

Road Use of PITs

PITs present special hazards when operated on roadways. Therefore, the following requirements will apply:

- ❑ Only PIT's recommended by the manufacturer shall be used on roadways. Hard-rubber tire PITs or "warehouse PITs" should not be used on roadways.
- ❑ A "Slow-Moving Vehicle" sign (orange triangle) shall be mounted to the rear of PITs recommended for road use.
- ❑ PITs shall not carry loads that are wider than the widest dimension of the PIT or attachment being used.
- ❑ PITs being driven to a refueling point shall not carry loads.
- ❑ All loads shall be properly secured on the PIT prior to operation on roadways to prevent inadvertent load shifting, slippage, or dropping. The Supervisor shall determine proper methods of securing loads after all safety concerns have been addressed.
- ❑ PIT operators shall pay particular attention to motor vehicles and pedestrians while operating on roadways.
- ❑ PIT operators shall move to the right lane when traveling on roads to allow passing vehicles adequate clearance. Pull over and stop when necessary.

Operators Pre-Shift Inspection (Always Consult OEM Instructions for additional Inspection Guidelines)

Gas, LP, or Diesel Forklift

Date _____ Vehicle No. _____ Shift _____

Type & Model _____ Hour Meter _____

OK	Visual Checks	Maintenance Needed-Reported To:
	Fluid Levels – Oil, Radiator, Hydraulic	
	Leaks – Hydraulic Oil, Battery, Fuel	
	Tires – Condition and Pressure	
	Forks, Top Clip Retaining Pin & Heel – Condition	
	Load Backrest Extension – Solid Attachment	
	Hydraulic Hoses, Mast Chains & Stops	
	Safety Warnings – Attached & Legible	
	Operators Manual – Located on Truck & Legible	
	Capacity Plate – Attached; Information matches Model & Serial Nos. and attachments.	
	Seat Belt – Buckle and retractor working smoothly.	
Operational Checks – Unusual Noises Must be Reported Immediately		
	Accelerator Linkage	
	Parking Brake	
	Steering	
	Drive Control – Forward & Reverse	
	Tilt Control – Forward & Back	
	Hoist & Lowering Control	
	Attachment Control	
	Horn	
	Lights	
	Back-Up Alarm	
	Hour Meter	
	Battery Discharge Gauge	

Daily Pre-Shift Inspections are an OSHA requirement. Our Company requires that you document that these inspections have been made. Any questions concerning this process should be directed to your Supervisor, immediate Supervisor or the Safety Director.

Operators Name:	Operators Signature:	Date:

Rough Terrain Forklift Trucks

In addition to the operating and licensing guidelines found under Powered Industrial Trucks – the following shall apply (only when applicable) to operators of rough terrain forklift trucks (Class VII) that are operated at TEI by TEI employees and/or Contractor employees.

Stability

Rough terrain forklifts are stable when properly operated. Improper operation, faulty maintenance, or poor housekeeping may contribute to a condition of instability. Other conditions which may affect stability are:

☒ Ground & Floor Conditions	☒ Grade
☒ Speed	☒ Loading
☒ Dynamic & Static Forces	☒ Wheelbase
☒ Counterweight Location	☒ Improper Tire Inflation
- ☐ Rough terrain forklift trucks equipped with attachments must be operated as a partially loaded truck even when there is not a load on the attachment.
 - ☐ The amount of forward and rearward tilt to be used is governed by the application. The use of maximum rearward tilt is allowable under certain conditions, such as traveling with the load lowered. The stability of a rough terrain forklift truck does not encompass consideration for excessive tilt at high elevations or the operations of trucks with excessive off-center loads.



Operator Responsibility

- ☐ All operators must be familiar with the operation and function of all controls and instruments before operating a rough terrain forklift truck.
- ☐ Before operating the truck, read and be familiar with the operator's manual for the particular truck being operated.
- ☐ Check for adequate clearance before driving under electrical lines, bridges, etc.
- ☐ Checking ground conditions for route of travel and lift area.

General Information

Before starting to operate a rough terrain forklift truck:

- Be in operating position and fasten seat belt.
- Place directional controls in neutral.
- Disengage clutch on manual transmission equipped rough terrain forklift trucks, or apply brake on power shift or automatic transmission equipped trucks.
- Start engine.

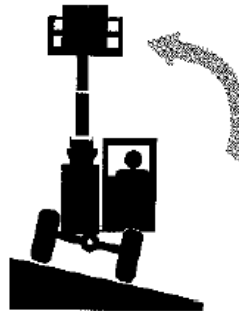
Do not start or operate the rough terrain forklift truck, any of its functions, or attachments from any place other than the designated operator's position.

Traveling

- ❑ When rough terrain forklift trucks are equipped with individual wheel brake pedals, lock pedal together for simultaneous operation before travel on public roads or when changing job sites.
- ❑ For rough terrain forklift trucks equipped with a differential lock, the lock should not be engaged when driving on the road or at high speeds or when turning. If the lock is engaged when turning, there could be loss of steering control.

Loading

- ❑ Improper use of stabilizer controls (if so equipped) could cause rough terrain forklift truck upset. Use stabilizers only in compliance with the manufacturer's instructions.
- ❑ For rough terrain forklift trucks equipped with lateral leveling:
 - Level the frame before raising the boom or mast, with or without a load.
 - Lateral leveling should not be used to position an elevated load – lower the load and reposition the rough terrain forklift truck.



- ❑ Handle only stable or safely arranged loads:
 - When handling off-center loads which cannot be centered, operate with extra caution.
 - Handle only loads within the capacity of the rough terrain forklift truck.
 - Handle loads exceeding the dimensions used to establish rough terrain forklift truck capacity with extra caution. Stability and maneuverability may be adversely affected.

Suspended Loads

- ❑ The handling of suspended loads by means of a crane (boom) or other device can introduce dynamic forces affecting the stability of a rough terrain forklift truck that are not considered in the stability criteria. Grades and sudden starts, stops, and turns can cause the load to swing and create a hazard if not externally stabilized.
- ❑ When handling suspended loads:
 - Do not exceed the truck manufacturer's capacity of the rough terrain forklift truck as equipped for handling suspended loads.
 - Only lift the load vertically and never drag it horizontally.
 - Transport the load with the bottom of the load and the mast as low as possible.
 - With the load elevated, maneuver the rough terrain forklift truck slowly and cautiously, and only to the extent necessary to permit lowering to the transport position.
 - Use tag lines to restrain load swing whenever possible.

Elevating Personnel

A rough terrain forklift truck should not be used to lift people unless there is no other practical option. If a rough terrain forklift truck must be used to lift people, the following precautions must be taken:

- ❑ Provide a personnel platform which complies with the design requirements listed in the appropriate standard.
- ❑ Securely attach the platform to the lifting carriage or forks.
- ❑ Secure the lifting carriage and forks to prevent them from pivoting upward.
- ❑ Deactivate the rotation on trucks equipped with rotation.
- ❑ When moving parts of the rough terrain forklift truck pose a hazard to elevated personnel, provide appropriate protection.
- ❑ Provide protection for personnel (in their normal working position on the platform) from moving parts of the rough terrain forklift truck that presents a hazard.
- ❑ Provide overhead protection as needed by the operating conditions.
- ❑ Lifting mechanisms need to operate smoothly through the entire lift range – while loaded or unloaded. All lift limiting devices and latches, if provided, need to be working properly.
- ❑ Be certain that the mast or boom travel is vertical – do not operate on a side slope unless the rough terrain forklift truck is leveled.
- ❑ Keep the platform horizontal. Never tilt platform forward or rearward when it is elevated.
- ❑ Be certain that the forklift truck has a firm footing.
- ❑ Be certain that required restraining means such as railings, chains, cable, body belt(s) with lanyard(s) etc., are in place and properly used.
- ❑ Place rough terrain forklift truck control(s) in neutral and set parking brake.
- ❑ Before elevating personnel, area should be marked to warn others of work being performed by elevated personnel.
- ❑ Maintain a path of platform travel that is clear of hazards (i.e., storage racks, scaffolds, overhead obstructions, and electrical wires).
- ❑ Keep hands and feet clear of controls other than those in use.
- ❑ Always lower the platform, if you must move the forklift truck for adjustments in positioning.
- ❑ Alert elevated personnel before moving the platform. Then move the platform smoothly and with caution.
- ❑ A trained operator shall be in position to control the forklift truck or available to operate controls if the platform is not equipped with controls. *The operator shall remain at the operator station if an employee is elevated.*
- ❑ The combined mass (weight) of the platform, load, and personnel shall not exceed one-third of the capacity at the rated load center position as indicated on the information plate(s) of the forklift truck on which the platform is used.
- ❑ Personnel are to maintain firm footing on the platform. Use of railing, planks, ladders, etc., on the platform for purpose of achieving additional reach or height is prohibited.
- ❑ Be certain that personnel and equipment on the platform do not exceed the available space.
- ❑ Platform shall be lowered to floor level for personnel to enter and exit. Personnel shall not climb on any part of the rough terrain forklift truck in attempting to enter or exit.
- ❑ Any harness, lanyard, or deceleration device which has sustained permanent deformation or is otherwise damaged shall be replaced.
- ❑ Prohibit modification to the platform that is detrimental to its safe use.



**Daily Pre-Use
Inspection Checklist
Vertical Mast PIT**

Date Inspected:

Thompson Equip. ID# or
Serial #

Make/Model:

Machine Hours:

Performed By:

The operator shall inspect the Fork Lift prior to placing the machine in service at the beginning of each work shift

Inspection Item & Description	What are you looking for?	P/F (Pass/Fail)
With Engine OFF		
Fuel, Hydraulic Oil, Engine Oil, Radiator Coolant, Transmission Fluid, Brake Fluid	Leaks, level	
Tires	Condition and pressure, tread within acceptable limits (no excessive wear)	
Forks, top clip retaining pin and heel	Check condition	
Hydraulic hoses, mast chains, cables, and stops	Visual check, leaks, damage	
Overhead guard	Attached, damage	
Safety warnings	Attached, visible, legible (refer to parts manual for location)	
Battery	Check water/electrolyte level & charge	
All engine belts	Cracked, damage, rips, visual checks	
Engine air cleaner	Squeeze rubber dirt trap or check restriction alarm if so equipped	
Fuel sediment or (diesel)	Condition	
Operators manual & load chart (if applicable)	In cab and readily available to operator	
Nameplate	Attached and information matches model, serial number and any attachments	
Seat belt, buckle, retractor	Condition, torn, ripped, damage to housing	
Hood Latch	Adjusted and securely fastened	
With Engine On		
Accelerator or direction control pedal	Functioning smoothly and properly	
Service and parking brakes	Functioning smoothly and properly	
Steering operation – drive control (forward/Reverse)	Functioning smoothly and properly	
Tilt Control – Forward and back	Functioning smoothly and properly	
Hoist and lowering control	Functioning smoothly and properly	
Attachment control	Operation	
Horn and lights	Functioning properly	
Cab (if equipped) – Heater, defroster, wipers	Functioning properly	
Gauges: Ammeter, engine oil pressure, hour meter, fuel level, temperature instrument monitors	Functioning properly	
Comments:		

  Daily Pre-Use Inspection Checklist	Date Inspected:	Thompson Equip. ID# or Serial #
	Make/Model:	Machine Hours:
	Performed By:	
The operator shall inspect the Class VII PIT prior to placing the machine in service at the beginning of each work shift		
Inspection Item & Description	What are you looking for?	P/F (Pass/Fail)
On the Machine, Outside the Cab		
Mirror	Clean, damage, properly adjusted	
Windows	Clean, damage, front and top	
Windshield Wipers	Arm and rubber blade intact	
Forks	Damage, cracks, misalignment, check welds, locking pins in place and secure	
Warning Decals	Missing, legible, damaged	
Tires	Damage, pressure, bulges	
Wheels	Loose lug bolts, bent rims, cracks	
Differentials	Oil leaks, cracks in housing	
Guards & Covers	Damage, in place	
Steps & Handrail	Damage, cleanliness	
Stabilizer Arms, Cylinders, outriggers, pads	Damage, oil leaks, cylinder rod, missing bolts	
Battery/Terminals	Cable connections, water, clean – no corrosion	
Overall Machine	Loose/missing nuts & bolts, loose guards, damaged parts, cleanliness, lights	
Engine Compartment		
Engine oil/coolant/hydraulic oil	Fluid levels	
Radiator	Fin blockage, leaks, cleanliness	
All hoses	Cracks, wear spots, leaks	
Air filter	Cleanliness	
All belts	Tightness, wear, cracks	
Overall engine compartment	Trash or dirt buildup, leaks	
Inside the Cab		
Control, gauge lenses	Proper function, damage, cleanliness	
Load charts, warning decals	In place in cab, legible	
Seat, seat belt, buckle and mounting	Damage, wear, adjustment, pedal travel	
Horn, backup alarm, lights, wipers	Proper function	
Windows and mirrors	Condition, clean, adjust	
Fire Extinguisher	Charge, damage, inspection card to date	
Overall cab interior	Cleanliness	
Comments:		

	Training Title: Operator- Forklift	Instructor:		Instructor Notes:
	Method: Practical (Hands-On Evaluation)	Released: 04/2017	Revision: 1	Location:

Instructions: Use this checklist during the field session to evaluate operator proficiency. It shall also be used for period evaluation or re-training due to improper operation of a forklift to ensure that operators are aware of how to operate forklifts properly.

Operator Name:	Evaluator Name:	Date of Evaluation:			
Mfg.:	Model:	Class of PIT (i.e., Forklift):			
OPERATOR BEHAVIORS	RATING (✓ check one)				
Pre-Use Inspection	Good	Fair	Poor	N/A	COMMENTS
Performs Operator's Daily Pre-Use Inspection & Documents findings on checklist					
Picking Up The Load	Good	Fair	Poor	N/A	COMMENTS
Square up on the center of the load.					
Stop with the fork tips about 1 foot from the load.					
Clear personnel from the area near the load.					
Level the forks; then slowly drive forward until the load contacts the carriage.					
Lift the load carefully and smoothly until it is clear					
Tilt the mast back slightly to stabilize the load.					
Look over both shoulders.					
After out and stopped, lower the load to travel height.					
Traveling	Good	Fair	Poor	N/A	COMMENTS
Do not raise or lower the load and forks while traveling.					
Maintain a safe speed.					
Observe all traffic rules, warning signs, floor load limits and overhead clearances.					
Keep arms and legs inside the forklift.					
Follow other vehicles at safe distance.					
Slows down when cornering.					
Uses the horn to alert others.					
Travel with the load facing uphill while on a ramp or incline.					
Stop smoothly					

Putting Down A Load	Good	Fair	Poor	N/A	COMMENTS
Make sure there is sufficient clearance for the load					
Clear personnel from the area near the load.					
Square up to the location; then stop about 1 foot away.					
Raise the load to placement level.					
Move slowly forward.					
If the load is on a pallet, lower it into position and lower the forks further.					
Look over both shoulders before backing out.					
Back straight out until the forks have cleared.					
Lower the forks to traveling position.					
Parking	Good	Fair	Poor	N/A	COMMENTS
Fully lower the forks					
Neutralize the controls					
Set the brakes					
Turn off the power					
If parked on an incline, block the wheels					
Park only in authorized areas					
Fueling And Battery Recharging	Good	Fair	Poor	N/A	COMMENTS
Engine off					
Fire extinguisher readily available					
Proper personal protective equipment worn.					
Safe fueling and battery recharging procedures followed.					
Spills cleaned up properly & immediately.					

Based on my observations, the operator has completed the evaluation and (Mark appropriate column):

	Is qualified to run the equipment with no restrictions and no required follow-up as a result of this evaluation.
	May not operate independently – Needs additional instruction, training and hours of operation prior to being re-evaluated. This will be outlined in the comments section.

Operator Name:		Date of Evaluation	Class of PIT (i.e., Forklift):																								
Comments:																											
<i>The Evaluator is required to check all appropriate columns:</i> <table border="1"> <thead> <tr> <th>YES</th> <th>N/A</th> <th>Action Item:</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td> - Reviewed successful results with operator and their immediate supervisor </td> </tr> <tr> <td></td> <td></td> <td> - Ensure they understand successful completion of this evaluation does not qualify them to operate other classes of PIT's </td> </tr> <tr> <td></td> <td></td> <td> - Reviewed and scheduled any follow-up actions (i.e., re-evaluation including dates, times, locations) as a result of an <u>unsuccessful</u> evaluation with operator and their immediate supervisor. These are specifically outlined them in the comments section of this form. </td> </tr> <tr> <td></td> <td></td> <td> - Reviewed limitations with the operator and their immediate supervisor on specific limitations to be enforced with the operator for purposes of field training (i.e., must be escorted by a TEI Qualified Operator) as well as - The very specific tasks the unqualified operator is permitted to do while under the care of this supervisor and Qualified Operator assigned to the employee. </td> </tr> <tr> <td></td> <td></td> <td> - I have written out specific details in the comments section of this evaluation and ensured all involved parties are clear in their understanding of said comments and future actions that may be required. </td> </tr> <tr> <td></td> <td></td> <td> - I have left a copy of the evaluation with the appropriate employee and their immediate supervisor to be kept by the supervisor in the site safety file for verification of operating status and/or restrictions imposed. </td> </tr> <tr> <td></td> <td></td> <td> - I have submitted the evaluation to the Safety Department (<i>electronically with originals to follow</i>) within 1 hour of completion of the evaluation. </td> </tr> </tbody> </table>				YES	N/A	Action Item:			Reviewed successful results with operator and their immediate supervisor			Ensure they understand successful completion of this evaluation does not qualify them to operate other classes of PIT's			Reviewed and scheduled any follow-up actions (i.e., re-evaluation including dates, times, locations) as a result of an <u>unsuccessful</u> evaluation with operator and their immediate supervisor. These are specifically outlined them in the comments section of this form.			- Reviewed limitations with the operator and their immediate supervisor on specific limitations to be enforced with the operator for purposes of field training (i.e., must be escorted by a TEI Qualified Operator) as well as - The very specific tasks the unqualified operator is permitted to do while under the care of this supervisor and Qualified Operator assigned to the employee.			I have written out specific details in the comments section of this evaluation and ensured all involved parties are clear in their understanding of said comments and future actions that may be required.			I have left a copy of the evaluation with the appropriate employee and their immediate supervisor to be kept by the supervisor in the site safety file for verification of operating status and/or restrictions imposed.			I have submitted the evaluation to the Safety Department (<i>electronically with originals to follow</i>) within 1 hour of completion of the evaluation.
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Operator's Name:		Operator's Signature:																									
Immediate Supervisor's Name:		Immediate Supervisor's Signature:																									

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Origination	Safety Div.	Vice President		08/01/12
01	Updated Division Management's Responsibilities; Reassigned Vice Presidents Responsibilities to Management	Safety Div.	Vice President	01/28/15	01/28/15
02	- Added Vertical Mast and Rough Terrain Equipment Inspection Forms - Added copy of the Training Hands-On Evaluation Form utilized by approved Trainers	Safety Div.	Management	11/18/18	11/18/18
03	- Added verification of chocks/supports/dock plates to loading & unloading procedures - Clarified that training must only be performed by a Qualified/Competent Instructor - Stated that only Qualified and properly certified (through all stages of training) operators may utilize any class of PIT on TEI property and worksites - Added verbiage to Pre-Use Inspection form instructing operator to consult OEM Inspection Guidelines - Example of Hands-On Evaluation (Revised and incorporated into training 05/2019)	Safety Div. w/Fleet	Management	10/2019	10/2019
09/2020	Annual Review – No Changes	N/A	Management w/Safety	N/A	N/A



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262

(330) 686-2300 F (330) 686-2362



Written Hazard Communication
& Global Harmonization System (GHS)

2020 - 2021

Introduction

The OSHA Global Harmonization System (GHS) and Hazard Communication Standard (GHS & HAZCOM) is intended to reduce the incidence of chemically-related occupational illnesses and injuries. The Standard establishes the minimum requirements that Thompson Electric, Inc. must adhere to, for communicating hazards to its workers, subcontractors, vendors and visitors (for purposes of this plan, the title of employee will encompass all of the prior). This standard is often referred to as the ***“Worker Right-To-Know”*** standard.

Hazard Communication requires Thompson Electric to explain all chemical hazards that an employee could encounter in a workplace either during routine work or in an accident. This information is to be conveyed through the utilization of three means:

1. Proper labeling of each container;
2. Access in the workplace to all appropriate safety data sheets (SDS); and
3. Training each employee about potential hazards.

Due to the nature of the construction industry, Thompson Electric recognizes that each worksite and/or existing building location will be different and unique, in its chemical inventory and the related hazards. Therefore, we have developed this program, and procedure, which provides a Hazard Communication Program and Global Harmonization System (GHS) **“template”** along with the associated background information that can be utilized at any Thompson Electric worksite, to protect employees from chemical hazards.

- ☐ A written hazard communication program shall be developed, implemented and maintained at each Thompson Electric work site that describes how labels and other forms of warning, SDSs, and employee information are made readily available to all employees, subcontractor employees, visitors, and when required members of the general public.
- ☐ A complete hazardous chemical inventory list along with all applicable SDS’s shall be developed and maintained and made readily accessible to all employees, visitors, and the host employer at each Thompson Electric work site. Remember each and every chemical on the site (including our subcontractors) and recorded on the list should have the same name as shown on its corresponding Safety Data Sheet (SDS).

This policy and procedure includes (at a minimum) provisions for:

- ☐ Training, Specific chemical hazards at that work site;
- ☐ Labeling requirements of the GHS & HAZCOM Standard;
- ☐ Safety Data Sheet – Contents, where to find and an explanation of how to apply this information;
- ☐ Thompson Electric’s GHS and Hazard Communication Program

This safety policy and procedure is established in accordance with Occupational Safety and Health Standards for General Industry Standard 29 CFR 1910.1200 and Occupational Safety and Health Standards for Construction Industry 29 CFR 1926.59. This policy and procedures shall apply to any and all employees, subcontractors and/or vendors at any and all Thompson Electric work-site locations, who are exposed to chemical hazards during the performance of their job duties.

Thompson Electric requires conformance with the safety standards set herein. A site-specific program may be utilized, providing it meets or exceeds the requirements set forth in this manual.

Policy

It is the policy of Thompson Electric, Inc. (herein referred to as TEI) to provide for the well-being of its employees, and affected subcontractor employees, by willingly adhering to the requirements of the Hazard Communication Standard 1910.1200 and other applicable local, state and federal requirements.

In 2012, the Hazard Communication Standard was revised to address those inconsistencies through the adoption of a “Globally Harmonization System” or GHS, established by the United Nations. This finalized standard is commonly referred to as “GHS & Hazcom 2012” or GHS and includes the new GHS requirements.

The GHS system makes the communication of hazards consistent through pictograms and other means that overcome language barriers, and provides information to chemical handlers through one label, as opposed to the many labels and languages formerly used to label chemical products. The GHS also provides a uniform approach to evaluating and classifying hazards, and to communicating those hazards through Safety Data Sheets or SDSs, formerly referred to as Material Safety Data Sheets or MSDSs.

OSHA developed a phased-in adoption schedule for the revised standard ranging from December 1, 2013 to June 1, 2016. The components of this policy have been revised to meet the new regulatory requirements.

For purposes of this policy and related procedures TEI defines a hazardous substance as any substance that is a physical hazard or a health hazard (i.e., compressed gases, explosives, flammables, oxidizers, carcinogens, toxins, irritants, or corrosives). Hazardous substances generally have a Safety Data Sheet (SDS) provided by the manufacturer.

When chemical hazards exist that cannot be eliminated, then;

- ❑ Engineering practices (i.e. increased ventilation);
- ❑ Administrative controls;
- ❑ Safe work practices; and
- ❑ Personal Protective Equipment (PPE)

Along with proper training will be implemented. These measures will be implemented to minimize those hazards to ensure the safety of employees and the public.

This program and procedure describes, in writing, how the criteria for labels and other forms of warning, SDSs, Employee information and Training are met. This written Global Harmonization System Hazard Communication policy and procedure includes:

- ❑ A description of the steps Thompson Electric takes to ensure that labels, SDSs and the employee information and training program meet OSHA requirements.
- ❑ Procedures used by Thompson Electric to evaluate hazards.
- ❑ Procedures used by Thompson Electric to list the hazardous chemicals known to be present in the work environment; either compiled for the workplace as a whole or for individual work areas.
- ❑ A description of and methods to be used, to inform employees of hazards related to unlabeled pipes in the work areas.
- ❑ The methods to be used to inform employees of hazards associated with non-routine tasks involving hazardous chemicals.
- ❑ The methods to be used to address hazardous chemicals on multi-employer work sites and multiple work sites (i.e., training in all chemicals on the work site based on potential employee exposure, staging of work to prevent exposure from chemical usage by other contractors or the host employer, etc.)

Training & Recordkeeping Requirements

All employees of Thompson Electric must receive GHS and Hazard Communication Training. The term “All Employees” is inclusive of all temporary, part-time, and full-time employees, and contractors.

- **Non-english speaking employees** – Thompson Electric will provide a translator to go through the training with non-english speaking workers. The trainer (through working with the translator) will ensure that the employee has knowledge of the various signs and symbols to be utilized on the work site. The translator will remain with the non-english speaking employee until such time as the trainer is satisfied of the employee’s ability to recognize and comprehend the signage and labeling systems in use.
- **Reading and Comprehensive Issues** – Training will be presented with video and audio. When reading is required (i.e., test questions, training handouts, etc.) Thompson Electric will provide an individual to read the questions, the training handouts, etc. to any employee who is experiencing difficulty or requests aid.
- Employees will be trained to work safely with chemicals. Training will include:
 - The GHS & Hazcom standard and its requirements.
 - Operations in the work area where hazardous chemicals are present.
 - The location and availability of the written GHS & Hazard Communication program.
 - Physical and health hazards of the chemicals in the work areas (i.e., flammability, carcinogenicity).
 - Measures employees can take to protect themselves by following the chemical specific information available through labels and SDSs.
 - Methods and observations to detect the presence of a hazardous chemical and the steps to be taken after the release is detected.
 - The measures and equipment (PPE) used for personal protection.
 - How to read and interpret information on labels and SDS.
- Employees will be trained:
 - At the time of initial employment or assignment;
 - Whenever a new hazard is introduced into the workplace.
- Refresher training will be provided at a minimum annually or:
 - When a Safety Manager, or any Thompson Electric Supervisor (regardless of status), has reason to believe an employee has inadequate knowledge of the Hazardous Communication program.
- The potential hazards of non-routine tasks shall be discussed immediately before each job.
- All training will be documented. A copy of the training document shall be placed in the employee’s personnel record file.
- Hazard training should be kept current with an ongoing program of:
 - Safety Meetings;
 - Environmental, safety, and health courses; and
 - Discussions between workers and supervisors.

Training by categories of materials is acceptable, provided that the hazards of groups of materials are similar. For example, no new training is required for a new solvent with similar hazards to an existing chemical for which training has already been provided and successfully completed.

Chemical Safety Training Checklist

Employee _____ Employee ID No. _____

Type of Training ____ New Hire ____ Refresher ____ Non-Routine Task

If Non-Routine Task, List Details:

Date of Training _____ Conducted by _____

On the above date, GHS/HAZCOM & Chemical Safety Training was provided. Training consisted of:

- ☐ Hazard Communication Requirements:
 - Written Product Information
 - GHS Hazard Communication Labeling
 - Understanding how to read and Use SDSs
 - Understanding how to utilize TEI's Online SDS Provider
 - Safe Handling and Storage of Chemical Products
- ☐ How to identify potentially harmful chemicals.
- ☐ Location of Written Hazard Communication Program, including online access
- ☐ Actions to take on a spill or fire involving chemical products.
- ☐ Location and content of SDSs, including how to access on-line SDS's
- ☐ Uses of personal protective equipment: Specifically, when PPE is required, what PPE is required, how to don and remove PPE, limitations of specific PPE, and proper care, maintenance, useful life and disposal.
- ☐ Walk-through of emergency procedures
- ☐ Workplace chemicals
- ☐ Specific responsibilities of employee

Employee Certification

I have received the above training on chemical product safety and am aware of the responsibilities for safe chemical use, storage, handling and emergency procedures.

Employee Signature: _____ Date: _____

Trainer Signature: _____ Date: _____

(Safety Department may approve a like simile of the above form (i.e., sign-in sheet giving detail of training, trainer, materials, qualified instructor, etc.)

Responsibilities

The Occupational Safety & Health Act assigns specific responsibilities to the Employer, Supervisors and Workers concerning the communication of hazardous chemicals in the workplace.

It is the responsibility of the Management Team, Safety Director, Supervisors, and all Employees to ensure the implementation of Thompson Electric Hazard Communication policy and procedure. It is also the responsibility of each Thompson Electric employee to report immediately any unsafe act or condition to his or her supervisor. Specific responsibilities are outlined below.

Management Team shall be responsible for the following:

- Review and update of Thompson Electric Hazard Communication Program to conform to current CFR standards. *This plan will be reviewed, at a minimum, annually.*
- Insure compliance with standards set forth in this program and policies by periodic inspection of worksites.
- Assisting Safety Director and/or Supervisors with:
 - Providing training as set forth in the program and policies;
 - Work with Human Resources Representative to provide qualified translators (for employee, subcontractor training, etc.) as needed
 - Providing consultative and audit assistance to ensure effective implementation of this safety policy and procedure;
- The Management Team may delegate the responsibility of various aspects of the Hazard Communication (GHS & HAZCOM) Program to a Qualified Organization. However, the Management Team's ultimate responsibility for his/her aspects of the program cannot be delegated.

Safety Director shall be responsible for the following:

- Identifying the employees affected by this safety policy and procedure.
- Conducting Chemical Inventories for each assigned worksite - *Appendix B* (and train other designated employees to perform Chemical Inventories.)
- Coordinating all program elements associated with Thompson Electric Inc.'s Hazard Communication Program.
- Working with purchasing to ensure that, when a hazardous chemical is ordered, an SDS will be sent to the Supervisor at least 5-7 days prior to shipping.
- With the approval of the Management Team, the Safety Director may delegate the responsibility of various aspects of the Hazard Communication Program (GHS & HAZCOM) to a Qualified Organization (as approved by the Management Team). However, the Safety Director's ultimate responsibility for his/her aspects of the program cannot be delegated.

General Foremen shall be responsible for the following:

- Employees are trained in GHS & HAZCOM before working with any hazardous chemicals.
- Reviewing chemical labels for procedures and hazards before allowing any employees to use hazardous chemicals.
- Employees wear the necessary PPE (and have been trained in the proper use and care of the PPE according to Thompson Electric PPE policy and procedure) before working with any hazardous chemical(s).
- Labels on hazardous chemicals are legible.

- Maintaining an SDS copy of all hazardous chemicals used at Thompson Electric worksite(s) for which he/she is responsible.
- With the approval of the Safety Director, the Supervisor may delegate the responsibility of various aspects of the Hazard Communication Program (GHS & HAZCOM) to another Qualified Person, Competent Person, or Qualified Organization (as approved by the Safety Director). However, the Supervisor's ultimate responsibility for his/her aspects of the program cannot be delegated.

Employees shall be responsible for the following:

- Complying with all applicable guidelines contained in this safety policy and procedure.
- Report any unsafe act associated with this safety policy and procedure to their immediate supervisor.
- Reviewing chemical labels for procedures and hazards before using any hazardous chemicals.
- Reporting any unlabeled or defaced hazardous chemical containers immediately to the Supervisor.
- Employees who are assigned different types of PPE are to keep them available and in good working order at all times and to have them replaced when they become worn or unsafe.

Outside Contractor or Sub-Contractor Responsibilities

- Any time an outside contractor brings a hazardous substance(s) into the workplace, a SDS(s) for the substance(s) must be received. Similarly, a SDS(s) for all hazardous substances in the area that the contractor will be working must be provided to the contractor. This exchange will be coordinated by the Safety Director, or in his/her absence whoever is granting the contract.
- Service Contractors whose work or materials pose a health hazard to employees shall be responsible for the training and education requirements outlined under the training section of this policy and procedure.
- The above cross-training must be documented and the records must be retained at the worksite where the work is performed. Copies of the cross-training records must be sent to Thompson Electric main office, where a copy will be inserted into the employee's file.
- Outside Contractors must comply with all the provisions of the Hazard Communication Standard while serving on a Thompson Electric worksite. Periodic audits from the Safety Director will be performed to assure compliance.
 - In order to assure compliance, all onsite contractors shall be provided a copy of Thompson Electric's GHS Hazard Communication Policy.

Plan Definitions

The following is a list of standard terms and definitions that apply to this policy and procedure.

Chemical Manufacturer – A manufacturing facility classified in Standard Industrial Classification (SIC) Codes 20 through 39 where chemicals are produced for use and distribution.

Chemical Name – Refers to the scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS) or a name which will clearly identify the chemical for the purpose of conducting a hazard evaluation.

Common Name – Any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a chemical other than by its chemical name.

Competent Person - Person capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees and who has the authorization to take prompt corrective measures to eliminate them.

Distributor – Any business, other than a chemical manufacturer or importer, which supplies hazardous chemicals to other distributors or to purchasers.

Hazardous Chemical – Any element, chemical compound, or mixture of elements and/or compounds which is a physical or health hazard.

Label – Any written, printed, or graphic material displayed or affixed to containers of Hazardous Chemicals.

Safety Data Sheet (SDS) – SDS means chemical information sheets drawn up in conformity with hazardous chemical standards.

Storage or Container – Will have the ordinary meaning; however, it does not include pipes used in the transfer of substances or the fuel tanks of self-propelled internal combustion vehicles.

Multiple Worksites or Multiple Employer Worksites

Where employees must travel between work places during a work shift (multiple work sites), TEI's written GHS and Hazcom program will be kept at the primary job site. If there is no primary job site, then a copy of the written program, its CIL and related SDSs will be sent with the employees.

It is each Project Manager's responsibility to ensure the following OSHA regulations not only for TEI employees but for all of our multiple employer worksites (i.e., Overseen by General Contractor, customer representative, PSM facilities, etc.):

Per 29 CFR 1910.1200(e)(2), the lead employer at a multi-employer workplace that produces, uses, or stores hazardous chemicals must ensure that the hazard communication programs developed and implemented under 29 CFR 1910.1200(e) include the methods the lead employer will use to:

- Provide the other employer(s) access to Safety Data Sheets for each hazardous chemical employees may be exposed to while working;
- Inform the other employer(s) of any precautionary measures that need to be taken to protect; employees during the workplace's normal operating conditions and in foreseeable emergencies;
- Advise the other employer(s) of the labeling system used in the workplace;
- Consult with the Safety Department for any assistance in meeting these requirements.

Exclusions & Products Exempt From Coverage

- The following items are exempt from OSHA regulations that govern chemical health hazard communication.
 - Any consumer product or hazardous substance used in the workplace in the same manner, duration, and frequency as normal consumer use. For example, cans of spray paint intended for short, one-application use would not be covered by this program. However, routine use of such materials by a professional painter would be covered. Users must understand the hazards of all consumer products and use them in accordance with the precautions on the label or other similar warnings.
 - Hazardous waste material is not covered by the hazard communication rule. It is regulated by the Environmental Protection Agency (EPA) and/or various state, county and local agencies.
 - Wood or wood products when the only hazard is flammability or combustibility. ***Note: Wood or wood products that have been treated with a hazardous chemical – including wood that may be subsequently sawed or cut, generating dust – are not exempted.***
 - Articles (manufactured items or products) that do not release or otherwise result in exposure to a hazardous chemical under normal conditions of use.
 - Foods, drugs, and cosmetics (regulated by the Food and Drug Administration) intended for personal consumption or use by employees in the workplace.
 - Tobacco and tobacco products.
 - Nuisance particulates when the chemical manufacturer or importer can establish that they do not pose physical or health hazards covered under this section.
 - Ionizing and nonionizing radiation.
 - Biological hazards (reference Thompson Electric Exposure Control Plan or Bloodborne Pathogens).

Non-Routine Tasks

Non-routine tasks are defined as working on, near, or with unlabeled piping, unlabeled containers of an unknown substance, confined space entry where a hazardous substance may be present and/or a one-time task using a hazardous substance differently than intended (i.e., using a solvent to remove stains from tile floors).

Steps for Non-Routine Tasks:

- Step 1: Chemical Hazard Determination (see section immediately following)
- Step 2: Determine Precautions – Consult any labels, SDSs, signage, etc.
- Step 3: Specific Training & Documentation -
- Step 4: Perform Task

All non-routine tasks will be evaluated by the Supervisor and Company Management before the task commences, to determine all hazards present. This determination will be conducted with quantitative/qualitative analysis (i.e., air sampling, substance identification/analysis, etc., as applicable).

Once the hazard determination is made, the Supervisor and Manager of Plant Support and Safety will determine the necessary precautions needed to either remove the hazard, change to a non-hazard, or protect from the hazard (i.e., use of PPE) to safeguard the Employees present. In addition, the Supervisor or Manager of Plant Support and Safety will provide chemical specific safety training for Employees present or affected and will document the training using the Chemical Safety Training Checklist and marking the “Non-Routine” Task area and include a brief explanation of the training conducted.

Chemical Hazard Determination

Chemicals to which workers may be exposed must be evaluated for hazards prior to their introduction into commerce or a workplace. This process starts with the manufacturer, importer, or, in some cases, the employer, who must determine hazards of chemicals they manufacture or use. Once chemical hazards are determined, that information must be provided to the user (i.e., end user) in the form of Safety Data Sheets (SDSs).

- Thompson electric shall obtain an SDS for each required chemical .

Chemical manufacturers and importers must evaluate chemicals produced or imported to determine if they are hazardous. Employers or re-formulators who choose not to rely on evaluations done by chemical manufacturers may conduct their own chemical hazard determinations.

Trade-secret provisions in the rules allow manufacturers to withhold a chemical’s identity; however, a hazard determination is still required, and the hazard information must still be provided to the users.

General Foremen must ensure that all employees have “ready” access at all times to all SDSs and be trained to understand them.

- For purposes of this policy and procedure, a hazardous chemical is any substance that presents a **physical** or **health** hazard.
 - **Physical hazards** produce a dangerous situation outside the body.
 - **Health hazards** can cause health damage either immediately from short-term (acute) exposure or slowly through long-term exposure (chronic).

Exposure to these chemical hazards can occur through;

- Inhalation – breathing dust, vapors, or mists;
- Ingestion – eating or smoking while working around hazardous chemicals;
- Absorption – chemicals entering the body through cuts, scratches, or broken skin.
- Thompson Electric has identified the following to be the most common types of hazardous chemicals found at most Thompson Electric worksites:
 - Acids
 - Adhesives
 - Caustics
 - Cleaning Agents
 - Degreasing Agents
 - Dusts
 - Flammables
 - Glues
 - Greases
 - Inks
 - Lacquers
 - Paints
 - Pesticides
 - Petroleum Products
 - Sealers
 - Solders
 - Strippers
 - Thinners
 - Wood Preservatives

Chemical Inventory List

- All existing facilities and worksites that manufacture, process, use, store, or produce hazardous chemicals shall compile and maintain a Chemical Inventory List. This list will contain the chemical name or the common name used on the SDS or container label.
- The Chemical Inventory List (CIL) will be updated (at a minimum) annually, in January of each year, and submitted to Thompson Electric corporate office. The CIL will be prepared at the facility or worksite where the chemicals are stored and used.
 - Individual CIL's must be submitted in alphabetical order and shall be verified for completeness by the appropriate Safety Director.
 - Each CIL is subject to audit by the Management Team. The Management Team will provide copies of the CIL to the Local Fire Department and the Local Emergency Planning Committee, as required.
- Each Thompson Electric established long term worksite shall have a CIL. The CIL shall include a listing of all hazardous substances present. Corporate headquarters will develop the overall company CIL by combining the individual lists supplied by each Safety Director for each applicable worksite and/or location.
- Each time a worksite receives a new hazardous substance, the substance must be added to the worksite CIL within 30 days. A copy of the CIL, along with the original copy of the Material Safety Data Sheet (SDS) for the new substance, must then be sent to corporate headquarters and retained at the work site.

Sample - Hazardous Chemicals Inventory List

[illegible]

In accordance with 29 CFR 1910.1020(d)(1)(ii)(B), this form shall be retained for 30 years after the chemical has left the premises.

Safety Data Sheets (SDSs)

- The Safety Data Sheets (SDSs), *previously* called Material Safety Data Sheets, is the primary written means of conveying information concerning chemical hazards to employers and employees. The party that first introduces a hazardous chemical into commerce or the workplace is required to prepare an SDS for the material. Every chemical manufacturer or importer must develop or obtain an SDS for each hazardous chemical it produces or imports [29 CFR 1910.1200(g)]. Distributors also must provide SDSs for each hazardous chemical they distribute.
- The Project Manager, working with field management and safety, shall be responsible for keeping and maintaining Safety Data Sheets used by employees on their projects in the course of their job duties. If a customer requires a specific product/chemical to be utilized it is the Project Manager's responsibility to work with field management and safety to ensure all affected employees are aware of the hazards presented by the product and have reviewed the SDS prior to utilizing it.
- A Chemical Inventory List of known hazardous chemicals used by TEI on their worksite shall be located in each worksite SDS book.
- SDSs shall be referenced during the creation of the pre-job Task Hazard Analysis when appropriate to ensure proper PPE and other safety considerations listed in the SDS are listed on the THA and reviewed with all affected crew members.
- SDSs shall be gathered and organized in such a manner as to make accessing the information readily available and convenient at all times while employees are working. They shall be well maintained and readily accessible in each work area. SDSs can be maintained at the primary work site. However they must be available in case of an emergency. SDSs must be made available, upon request to employees, their designated representatives, the Assistant Secretary & the Director.
- The SDSs are required to include the following sixteen (16) sections of information:
 - Product & Company Identification
 - Hazards Identification
 - Information on Ingredients
 - First Aid Measures
 - Firefighting Measures
 - Accidental Release Measures
 - Handling & Storage
 - Exposure Control/Personal Protection
 - Physical & Chemical Properties
 - Stability and Reactivity
 - Toxicological Information
 - Ecological Information
 - Disposal Considerations
 - Transport Information
 - Regulatory Information
 - Other Information
- No new product of a hazardous nature will be accepted onto any TEI worksite, warehouse, lay-down yard or office without an SDS on file or accompanied by the material.
- Safety Data Sheets shall not be discarded at any time. When a material is no longer used on the worksite, warehouse or office the SDS shall be pulled from the SDS Book and archived by TEI according to our records retention policy.

Container Labeling

- All existing labels on containers of hazardous substances must remain intact. The labels must be legible and written in English. At no time shall an employee remove or deface existing labels on incoming containers of hazardous chemicals unless a like GHS Compliant label is immediately created and placed on said container. There must be a GHS Compliant label in addition to an NFPA Hazard rating label.
- The Site Foreman and/or General Foreman or Superintendent shall be responsible for ensuring that all containers have the original manufacturer product use information and warning label. GHS labels may vary in appearance, but they are required to include the six (6) specific elements. A label example is provided below:

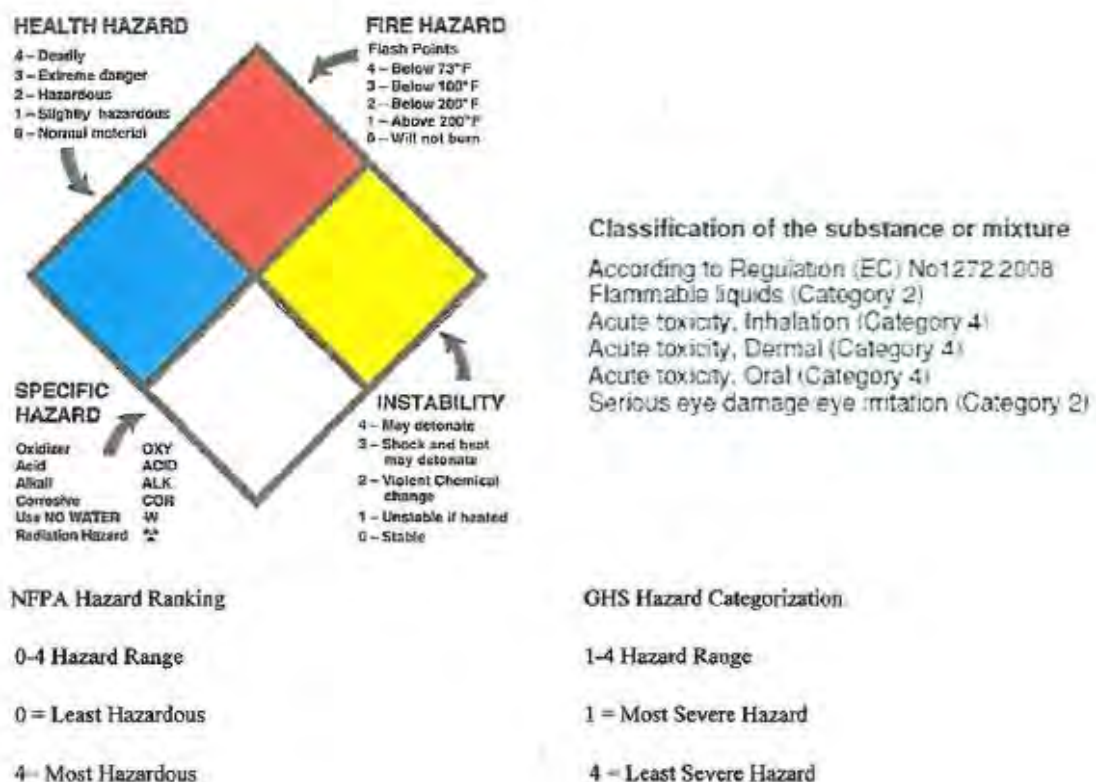


1. Product Identifier – The product name provided in this example (n-Propyl Alcohol) should match the identifier on the product’s Safety Data Sheet (SDS).
2. Signal Word – A signal word on a label used to indicate the relative level of severity of a hazard and to alert the reader to a potential hazard, The signal words used are:
 - a. Danger; Severe hazards
 - b. Warning; Less severe hazardsIn the example shown, the manufacturer has used the word “Danger” to indicate a more severe hazard.
3. Hazard Statements – Hazard statements are statements assigned to a hazard class that describes the nature of the products hazards “may cause dizziness” for example.
4. Precautionary Statements – Statements which describes recommended measures to minimize or prevent adverse effects resulting from exposure, “keep away from heat” for example.
5. Supplier Identification – The name, address, and telephone number of the manufacturer or supplier, in case you need to contact them.
6. Pictograms: Graphical symbol intended to convey the specific hazard information visually, in the case of our sample label, the manufacturer has used 3 pictograms to denote hazards. Pictograms are explained in more detail on the following page.

- Pictograms – Under the Global Harmonization Systems, graphical symbols called “pictograms” are used to convey specific hazards. Product specific pictograms will be found on both GHS labels and with Safety Data Sheets (SDSs). The nine established pictograms, and their conveyed hazards, are illustrated below:

HCS Pictograms and Hazards		
Health Hazard  ▪ Carcinogen ▪ Mutagenicity ▪ Reproductive Toxicity ▪ Respiratory Sensitizer ▪ Target Organ Toxicity ▪ Aspiration Toxicity	Flame  ▪ Flammables ▪ Pyrophorics ▪ Self-Heating ▪ Emits Flammable Gas ▪ Self-Reactives ▪ Organic Peroxides	Exclamation Mark  ▪ Irritant (skin and eye) ▪ Skin Sensitizer ▪ Acute Toxicity ▪ Narcotic Effects ▪ Respiratory Tract Irritant ▪ Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder  ▪ Gases Under Pressure	Corrosion  ▪ Skin Corrosion/Burns ▪ Eye Damage ▪ Corrosive to Metals	Exploding Bomb  ▪ Explosives ▪ Self-Reactives ▪ Organic Peroxides
Flame Over Circle  ▪ Oxidizers	Environment (Non-Mandatory)  ▪ Aquatic Toxicity	Skull and Crossbones  ▪ Acute Toxicity (fatal or toxic)

- Prior to GHS adoption, Thompson Electric, Inc. promoted the NFPA (National Fire Protection Association) Hazard Warning Diamond Labeling system. The NFPA Hazard Warning Diamond is based on the NFPA standard 704 rating system. This standard provides a readily recognized, easily understood system for identifying hazards and their severity using color and number indicators. While in isolated cases this system is still in use, it does not meet the GHS requirements. Therefore, TEI takes the stand that the NFPA system can be used in addition to, but not in place of GHS labeling.
 - Referring to different systems can be confusing, but keep in mind that the GHS hazard category systems are unlikely to be found on product labels. Both ranking systems may appear in SDSs, but the ranking are identified as either GHS or NFPA ranking.



- **Secondary Labeling System** – When transferring a chemical from one container to another, or replacing a damaged label, TEI employees are required to label the new container properly to include:
 - Identity of the chemical
 - Appropriate hazard warning (using the GHS format described in this policy)
- **Stationary Process Container Labeling** - Safety Director and/or Supervisor may use/affix signs, placards, operating procedures, batch sheets, or other written material in lieu of affixing labels to stationary process containers, as long as the alternative method identifies the container(s) to which it is applicable and conveys the information required on secondary containers.
 - The substitute system must convey all the information required by the GHS and SDS requirements and be available to employees in their work areas at all times.

- In addition to the GHS/SDS labeling requirement for containers of hazardous substances, the area where the hazardous substance is used or stored must be properly marked. In order to accomplish this requirement, Thompson Electric has adopted the Uniform Laboratory Hazard Signage (ULHS) system. The signs identify the areas where hazardous substances are used or stored through pictograph symbols (*see examples below*). The signs will warn employees, contractors and visitors that proper precautions should be observed when entering the area.



- Hazardous waste containers shall clearly identify special hazards (i.e., carcinogens) and include the minimum information required on the hazardous waste label.

Chemical Spill

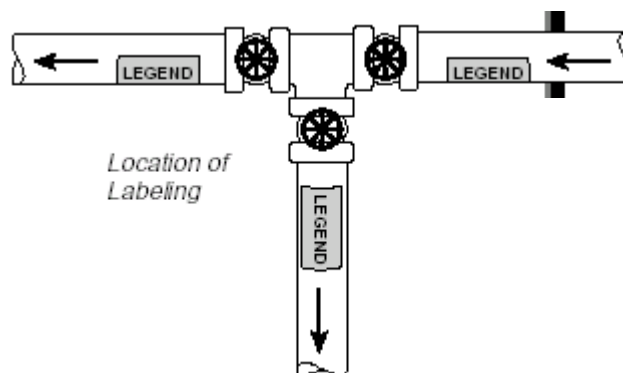
- Appropriate absorbent material shall be kept readily accessible wherever hazardous materials are stored, for example, Peatsorb for oils and gasoline. In the event of a hazardous spill, employees are to contain as much of the spill as possible using temporary dikes, and/or absorbent pads and materials. Employees are required to notify their Foreman or Supervisor immediately so that a determination can be made as to whether Emergency Responders should be notified in addition to any customer representatives. If it is an obvious emergency, the employees are to evacuate and call 911 prior to any other notifications. To gain as much information as possible, employees are to monitor the spill until the Emergency Responders arrive unless doing so would endanger their lives or the lives of others.
- Employees are to evaluate the probability of the hazardous spill reaching storm drains, sanitary sewers, or otherwise entering the waterways. They should also check into the possibility of land and air contamination and relay this information to the appropriate Emergency Responders if they need to notify them.
- Spills or releases of a hazardous nature shall be documented and investigated per TEI's Standard Work Instruction #01 – Incident Reporting & Investigation.

Pipe Labeling

This section shall apply to all piping systems containing hazardous substances or that use asbestos as a pipe insulation material in buildings, structures, and workplaces. This section does not apply to buried piping.

This section prescribes minimum labeling requirements for all piping systems that contain hazardous substances, transport substances in a hazardous state, or that use asbestos as a pipe insulation material.

- Pipes and piping systems that contain hazardous substances or transport substances in a hazardous state shall be labeled with one of the following:
 - Positive identification of the hazardous contents of a piping system shall be by lettered labels. The label shall give the name of the contents in full or abbreviated form.
 - Contents shall be identified by labeling with sufficient detail to identify the hazard.
 - Label wording shall be brief, informative, and simple.
 - Labeling shall be accomplished by stenciling, the use of tape, adhesives, markers, or approved alternative means (approved by the Management Team of Thompson Electric)
 - Pipes or piping systems which used asbestos as a pipe insulation material shall be labeled in accordance with this policy and its related procedures.
 - The employer may use signs, placards, process sheets, batch tickets, operating procedures, or other such written materials in lieu of affixing labels to individual pipes, as long as the alternative method identifies the pipe(s) to which it is applicable and conveys the information required by this policy and procedure. The written materials shall be readily accessible to the employees in their work areas during each shift.
 - When working on existing pipes or near existing pipes this information will be reviewed immediately prior to the start of the work project. ***No employee should begin to work on any pipe that is not labeled*** until the Supervisor has reviewed the chemicals (if any) in the pipe, put into place any and all protective/safety measures to be taken. These measures may include, but not be limited to; ventilation, respirators, presence of another employee and emergency procedures for contamination and/or spill situations.
- **Location of Labeling:**
 - Labeling shall be applied where confusion may occur, such as close to valves or flanges and adjacent to changes in direction, branches, and where pipes pass through walls, floors, or ceilings.
 - Labeling shall be applied, at a minimum, at the beginning and end of continuous pipe runs.
 - For asbestos insulation, labeling shall be at a minimum, on unobstructed continuous pipe runs, every 75 feet.



Visibility:

- Where pipes are located above or below the normal line of vision, the lettering shall be placed below or above the horizontal centerline of the pipe.
- Where pipes are inaccessible and/or at a distance that precludes clear identification of the letters on labeling, alternatives to the labeling which meet all other requirements of this rule may be used (i.e., schematics posted on walls in work areas).

Classification of Hazards of Materials & Suggestions of Colors

Classification	Color Field **	Color of Letters For Legends
Materials Inherently Dangerous		
Flammable or Explosive	Yellow	Black
Chemically Active or Toxic	Yellow	Black
Extreme Temp. or Pressures	Yellow	Black
Radioactive Yellow	Magenta	
Materials of Inherently Low Hazard		
Liquid or Liquid Admixture	Green	White
Gas or Gaseous Admixture	Blue	White
** Alternative to the colors suggested may be acceptable if they meet all other requirements of this appendix and are used consistently on all pipes in a given location. (1) Color may be displayed on the piping by any physical means, but when it is used it shall be in combination with labels. (2) Color may be used in continuous, total length, or in intermittent displays.		

Types & Styles of Letters

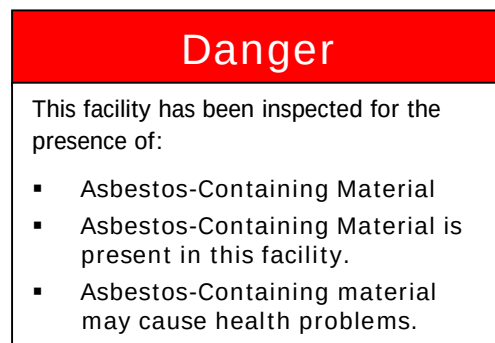
Outside Diameter Size		Length		Size	
in.	mm.	in.	mm.	in.	mm.
¾ to 1¼	19 to 22	8	200	½	13
1½ to 2	38 to 51	8	200	¾	19
2½ to 6	64 to 150	12	300	1¼	32
8 to 10	200 to 250	24	600	2½	64
Over 10	Over 250	32	800	3½	89
(1) Contrast shall be provided between color field and letters for readability. (2) Use of letters of black lettering in sizes ½ inch (13 mm) and larger, is recommended. (3) For identification of materials in pipes less than ¾ inch (19 mm) in diameter and for value and fitting identification, the use of a legible tag is recommended.					

Asbestos Notice & Labeling Requirements

- Pipes, boilers, storage vessels, structural members, or equipment with insulating material that might be removed, penetrated, damaged or otherwise disturbed by repair, remodeling, renovation, maintenance or other activity, shall be labeled with cautionary labels. Such caution labels shall be printed in letters of sufficient size and contrast as to be readily visible and legible. Each room or area where the conditions require that labels exist shall have a minimum of one such label, and additional labels as is necessary, to insure ready visibility and legibility. Equipment with asbestos-containing material shall bear the following label:



- Areas with asbestos-containing material used as acoustical material on ceilings or walls shall post the following notice:



Chemical Exposure (Procedures & Related Documentation)

- Exposure means that an employee is subjected to a hazardous chemical in the course of employment through any route of entry:
 - Inhalation;
 - Ingestion;
 - Skin Contact; or
 - Absorption

And includes potential (i.e., accidental or possible) exposure as referenced by the SDS.

- When Thompson Electric discovers that an employee has received a potentially hazardous exposure to any substance or agent, Thompson Electric will immediately notify the individual and take such steps that may be necessary to provide medical evaluation, monitoring, and/or treatment.
 - Likewise, an employee that has received a potentially hazardous exposure to a substance or agent must immediately notify Safety Director, and/or Supervisor of the exposure.
- After the appropriate safety and health precautions have been taken, it is the responsibility of the employee's immediate Supervisor to fill out an Employee Exposure Report (EER).

- EER forms are available at every worksite. The completed EER should be submitted to the Management Team and/or Safety Director (original copy), with a copy retained at the worksite, and a copy provided to the employee.
- The Human Resources Representative will place the EER form in the employee's permanent personnel file to be retained for the length of employment plus 40 years.
- An Affected Employee (or designated representative) may make a request to the Safety Director and/or Human Resources Representative for access to copies of the appropriate CIL and SDS's. Access to the appropriate CIL and SDS's shall be granted within a reasonable time, place, and manner, but never later than one working day after the request for access is made. In addition, whenever an Affected Employee or designated representative requests a copy of the CIL and/or SDS's, the Safety Director or Human Resources Representative shall, within 15 days, assure that either a copy or a mechanical means to copy is provided.
- An employee that has requested information and has not received the requested information within the specified time period may refuse to work with the substances or refuse to work at the location for which the request was made.
 - Thompson Electric may not discharge or initiate any adverse personnel action against any employee because the employee has exercised his/her right to the requested information. Furthermore, Thompson Electric may not request or require an employee to waive any rights under this policy. Any such waiver executed shall be null, void, and unenforceable.
- Employees working in areas where exposure(s) to hazardous substances exist shall be required to perform their jobs in accordance with precautions communicated to them during training and education programs.
 - The Safety Director may take the appropriate disciplinary action when an employee does not comply with the precautionary measures this policy and procedure requires.

Employee Chemical Exposure Report			
Last Name	First Name & Middle Initial	Social Security No.	Phone Number
Project Identification (i.e., name, contract number)		Physical Address/Location	
Date/Time of Exposure	Duration of Exposure	Location of Exposure	
Chemical/Hazardous Substance Name(s)		Chemical Abstract Number(s) – CAS	
Trade and/or common name(s) of chemical(s) or hazardous substance(s):			
Type of exposure (i.e., inhalation, ingestion, contact).		If contact, what body part was involved?	
How did exposure occur? (Use additional sheets if necessary):			
Was Personal Protective Equipment available? ☐ Yes ☐ No If no explain:	Was Personal Protective Equipment used? ☐ Yes ☐ No If no explain:	If Personal Protective Equipment was used what type(s)?	
Did employee receive training/instructions prior to exposure? (Explain)			
Were any symptoms present at time of exposure? ☐ Yes ☐ No If so, describe (attach physician's report, if applicable):			
Severity of Exposure: ☐ First Aid ☐ Medical Treatment ☐ Unknown Describe:			
Did employee lose time from work? ☐ Yes ☐ No		Estimate of lost time:	
Were other employees exposed? ☐ Yes ☐ No If so, list names (use additional sheets if necessary):			
List suggestions to prevent reoccurrence (attach additional sheets as necessary):			

Exposed Employee's Signature

Today's Date

Print/Type Name of Safety Representative

Signature of Safety Representative

Off-Site Use or Transportation of Chemicals

An SDS will be provided to employees for each chemical and each occurrence of use or transport away from Thompson Electric facilities and/or worksites. All State and Federal DOT Regulations. Will be followed including use of certified containers, labeling and marking, securing of containers and employee training.

Task Evaluation

Each task that requires the use of chemicals should be evaluated to determine the potential hazards associated with the work. This hazard evaluation must include the chemical or combination of chemicals that will be used in the work, as well as other materials that will be used near the work. If a malfunction during the operation has the potential to cause serious injury or property damage, a Safe Operating Procedure (SOP) should be prepared and followed. Operations must be planned to minimize the generation of hazardous wastes.

Chemical Storage

The separation of chemicals (solids or liquids) during storage is necessary to reduce the possibility of unwanted chemical reactions caused by accidental mixing. Explosives should be stored separately outdoors. Use either distance or barriers (i.e., trays) to isolate chemicals into the following groups:

- Flammable Liquids: Store in approved flammable storage lockers.
- Acids: Treat as flammable liquids.
- Bases: Do not store bases with acids or any other material.
- Other Liquids: Ensure other liquids are not incompatible with any other chemical in the same storage location.

Chemicals will not be stored in the same refrigerator used for food storage. Refrigerators used for storing chemicals must be appropriately identified by a label on the door.

Information Chemical Users Must Know:	
Fire and/or Explosion Information	➤ Material Flash Point, auto-ignition temperature and upper/lower flammability limits. ➤ Firefighting techniques. ➤ Any unusual fire or explosive hazards.
Chemical Reaction Information	➤ Stability of Chemical ➤ Conditions and other materials that can cause reactions with the chemical. ➤ Dangerous substances that can be produced when the chemical reacts.
Control Measures	➤ Engineering Controls required for safe product use. ➤ Personal protective equipment required for use of product. ➤ Safe storage requirements and guidelines. ➤ Safe handling procedures.
Health Hazards	➤ Permissible Exposure Limit (PEL) and Threshold Limit Value (TLV). ➤ Acute or chronic symptoms of exposure. ➤ Main routes of entry into the body. ➤ Medical conditions that can be made worse by exposure. ➤ Cancer causing properties if any. ➤ Emergency and first aid treatments.
Spill & Leak Procedures	➤ Clean up techniques. ➤ Personal Protective Equipment to be used during cleanup. ➤ Disposal of waste and cleanup material

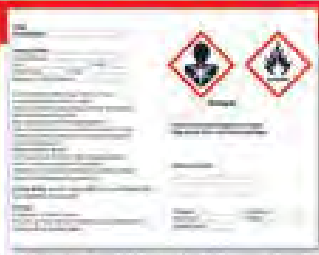
Assessing & Analyzing the Worksite/Jobsite for Chemical Hazards

There's a simple two-step process for assessing and analyzing the worksite/jobsite for chemical hazards:

1. Assess the workplace to see which hazardous chemicals are currently being used. Do this by conducting a walk-around inspection. Use the results of your assessment to create a list of hazardous chemicals (*see Chemical Inventory List (CIL) form on following page*). With chemical list in hand, obtain an SDS for each chemical in preparation for the next step.
2. With each SDS analyze the hazards presented by each chemical in the workplace. The SDS is your primary tool to determine the physical and health hazards, routes of entry, toxicity, and other information about each chemical at your worksite/jobsite.

Once you identify and know the nature of the hazards of each chemical, it becomes important to control those hazards by eliminating or reducing those hazards using a systematic approach.	
Engineering Controls	▪ Redesign, replace, substitute chemicals, machinery, equipment to eliminate or reduce the chemical hazard itself. ▪ Engineering controls are most effective when the hazard is eliminated or reduced to levels that do not require the use of administrative controls or PPE strategies that are dependent on appropriate behaviors for their success. ▪ This strategy seeks to control the hazard at the source by using such methods as total enclosure or substitution of a safer chemical. It also attempts to control the hazardous chemicals along the path by using such measures as ventilation.
Administrative Controls	▪ Change work procedures to reduce the duration, frequency, and severity of exposure to the chemical hazard. The chemical hazard is not eliminated or reduced using this strategy, only exposure to the chemical hazard. The primary focus is to incorporate safer work practices through written safety policies, rules, supervision and training.
Personal Protective Equipment (PPE)	▪ The use of PPE is probably the most common strategy, and in many cases is a mandatory requirement when working with hazardous chemicals. The worker uses protective equipment to set up a barrier between worker and hazard. Once again, the chemical hazard is neither eliminated nor reduced, and a high reliance is placed on appropriate use of PPE for this strategy to be successful.

Understanding GHS Hazard Communication Labeling



OSHA has updated the requirements for labeling of hazardous chemicals to align with the Globally Harmonized System (GHS). As of June 1, 2015, all labels will be required to have pictograms, a signal word, hazard and precautionary statements, the product identifier, and supplier identification. A sample revised label, including the required label elements, is shown at left. Supplemental information can also be provided on the label as needed.

Labels must contain the following required elements:

Product Identifier Lists the name or number used for the hazardous chemical. It provides a unique means by which a reader can identify the chemical.	Hazard Pictograms Conveys health, physical and environmental hazard information assigned to a hazard class and category. Includes a symbol plus other graphic elements, such as a border, background pattern, or color. There are eight mandatory OSHA pictograms designated under OSHA's Hazard Communication Standard for application to a hazard category.
Supplier Identification Lists the name, address and telephone number of the chemical manufacturer, importer, or other responsible party.	Signal Words Indicates the relative level of severity of the hazard and alerts the reader to a potential hazard on the label. "Danger" is used for the more severe hazards, while "Warning" is used for the less severe. These are the only two signal words a reader will see on a label.
Precautionary Statements Describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical or improper storage or handling.	Supplemental Information Lists any other information provided by the labeler such as the physical state of the chemical or directions for use.
Hazard Statements Lists standard OSHA phrases assigned to a hazard class and category that describe the nature of the hazard.	

HCS Pictograms and Hazards

Hazard Communication Standard Pictograms

As of June 1, 2015, the Hazard Communication Standard (HCS) will require pictograms on labels to alert users of the chemical hazards to which they may be exposed.

Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification.

Health Hazard  • Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	Flame  • Flammable • Pyrophoric • Self-Heating • Emits Flammable Gas • Self-Reactions • Organic Peroxides	Exclamation Mark  • Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder  • Gases Under Pressure	Corrosion  • Eye Damage • Corrosive to Metals • Skin Corrosion/Burns	Exploding Bomb  • Explosives • Self-Reactives • Organic Peroxides
Flame Over Circle  • Oxidizers	Environment (Non-Mandatory)  • Aquatic Toxicity	Skull and Crossbones  • Acute Toxicity (Other than Oral)

NEW SDS FORMAT

By June 1, 2015, chemical manufacturers, importers, or other employers preparing a safety data sheet (SDS) must format it using consistent headings in the following 16-section sequence:

- Section 1 Identification**—includes product identifier, manufacturer or distributor name, address, phone number, emergency phone number, recommended use, and restrictions on use
- Section 2 Hazard(s) identification**—includes all hazards regarding the chemical and required label elements
- Section 3 Composition/Information on ingredients**—includes information on chemical ingredients and trade secret claims
- Section 4 First-aid measures**—includes important acute or delayed symptoms or effects and required treatment
- Section 5 Fire-fighting measures**—lists suitable extinguishing techniques, equipment, and chemical hazards from fire
- Section 6 Accidental release measures**—lists emergency procedures, protective equipment, and proper methods of containment and cleanup
- Section 7 Handling and storage**—lists precautions for safe handling and storage, including incompatibilities
- Section 8 Exposure controls/Personal protection**—lists OSHA's PELs, threshold limit values (TLVs), appropriate engineering controls, and PPE
- Section 9 Physical and chemical properties**—lists the chemical's characteristics
- Section 10 Stability and reactivity**—lists chemical stability and possibility of hazardous reactions
 - 1 Toxicological information**—includes routes of exposure, related symptoms, acute and chronic effects, and numerical measures of toxicity
- Section 12 Ecological information***
- Section 13 Disposal considerations***
- Section 14 Transportation information***
- Section 15 Regulatory information***
- Section 16 Other information**—includes date of preparation or last revision

*Notation concerning Sections 12 to 15: OSHA will not enforce the information requirements in Sections 12 to 15; however, the SDS must include at least the heading names for those sections.

FIND SDS FAST

CHOOSE ACCESS:

COMPUTER

VISIT: thompsonelectric.kha.com



SELECT AN SDS BY CLICKING THE .PDF
ICON OR PRODUCT NAME

MS26 ID	Queue	PDF	Product Name	Manufacturer	Revision
100249	Add		Q101 Plastic Tank Shower All (Sop)	Pennatec, Inc.	2004-02-10
100221	Add		Q101 Fuel Tank Shower All (Sop)	Pennatec, Inc.	2001-04-18
100002	Add		H-500GL SEC 7 (Cleaning Shower Unit)	PENNY COMPANY	1996-11-07
100030	Add		H101 New-Build Fuel Comp. 3 (Sop)	GOLD EAGLE COMPANY	2003-07-17
100070	Add		Q201A Fuel Shower & Lubrication Unit (Sop)	Pennatec, Inc.	2004-01-30

VIEW ENTIRE SDS OR AT-A-GLANCE



MOBILE DEVICE



From your the App Store / Google Play search for the "SDS Mobile" app (icon pictured left for reference). Download and log in:

Username:

tei@sdsmobile.app

Password:

thompson

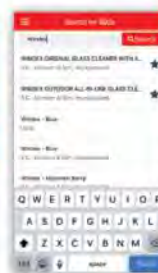


2



- **Navigate to "Settings"**
- **Tap the checkmark next to your organization name**
- **Click save**

3



Search for and review SDS prior to using a chemical

NOTE:

NOTE: SDS noted with a star are understood to be in your chemical inventory.

Non-starred items can be referenced from KHA's larger SDS database.

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	• Origination	Safety Div.	Vice President		08/01/12
01	• Removed the general title Supervisory Personnel and assigned specific responsibilities to General Foremen	Safety Div.	Vice President	12/28/12	06/01/13
02	• Replaced MSDS with SDS • Revised program to include not only SDS but GHS requirements	Safety Div.	Vice President	01/05/15	01/05/15
03	• Removed Vice President and incorporated their duties into Management • Revised program to include defacing and/or replacing labels on containers	Safety Div.	Safety Director	01/03/18	04/18/18
04	• Revised program to include New Chemical Inventory Form, SDS Provider information on GHS Labeling and SDS Format Card	Safety Div.	Safety Director	03/31/19	03/31/19
05	• Inclusion of Appendix A – Understanding GHS Hazard Communication Labeling • Inclusion of Appendix B – New SDS Universal Format • Inclusion of instructions for accessing and using the on-line SDS provider for TEI; Online SDS by KHA • Updated GHS/Hazcom training form	Safety Div.	Safety Director	10/01/19	10/01/19
09/2020	• Annual Review – No Changes	N/A	Management w/Safety	N/A	N/A



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362



Heat Illness

Recognition & Prevention

2021-2022

Introduction

Thompson Electric, Inc. (*herein referred to as TEI*) Employees often work outdoors or on job tasks in other areas at those times when the environmental risk factors for heat illness are present and as a result are at risk for developing heat illnesses if they do not protect themselves appropriately. The objective of this policy is employee awareness regarding heat illness symptoms, ways to prevent illness, and what to do if symptoms occur.

It is the policy of TEI to provide a safe, healthy and secure workplace for all employees by implementing an effective safety program. This Heat Illness Prevention Program applies to the control of risk of occurrence of heat illness and applies to all outdoor places of employment and other locations when the environmental risk factors for heat illness are present. Any employee participating in job tasks when environmental risk factors for heat illness are present will comply with the guidelines established in this document.

Definitions

Acclimatization - Temporary adaptation of the body to work in the heat that occurs gradually when a person is exposed to it. Acclimatization peaks in most people within four to fourteen days of regular work for at least two hours per day in the heat.

Heat Illness - Serious medical condition resulting from the body's inability to cope with a particular heat load, and includes heat cramps, heat exhaustion, heat syncope and heat stroke.

Environmental risk factors for heat illness - Working conditions that create the possibility that heat illness could occur, including air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and personal protective equipment worn by employees.

Personal risk factors for heat illness - Factors such as an individual's age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body's water retention or other physiological responses to heat.

Preventative recovery period - Period of time to recover from the heat in order to prevent heat illness. The term "shade" means blockage of direct sunlight. Canopies, umbrellas, and other temporary structures or devices may be used to provide shade. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool. For example, a car sitting in the sun does not provide acceptable shade to a person inside it, unless the car is running with air conditioning.

Responsibilities

Safety is responsible for:

- Preparing and maintaining a written program which complies with the requirements of applicable OSHA requirements.
- Assisting with providing training to all potentially impacted employees and their supervisors on the risks and prevention of heat illness, including how to recognize symptoms and respond when they appear.

Division Managers, Project Managers, and Supervisors are responsible for:

- Being aware of risk factors that contribute to heat illness;
- Reduce the risk of heat illness by taking special precautions when necessary;
- Be alert for the signs and symptoms of heat illness in employees;
- Allow employees to acclimate to working in hot conditions;
- Make sure employees working in hot conditions are accounted for at the end of the work shift;

- Ensure employees have access to potable drinking water and shade at all times;
- Monitor weather conditions and implement High-heat Procedures when temperatures equal or exceed 95 degrees Fahrenheit;
- Ensure procedures for contacting emergency medical services are in place, and if necessary, arrange for the transportation of employees to a point where they can be reached by an emergency medical provider;
- Know what to do and how to summon emergency responders should a heat illness emergency occur.

Employees are responsible for:

- Understanding and complying with the requirements of this program;
- Informing their supervisors of any factors that may increase their risk of heat related illness;
- Reporting the signs or symptoms of heat illness in themselves, or others, to their supervisor or designated site Emergency Responder immediately.

Training

Training shall be provided for employees and their supervisors at a minimum annually when working at locations where environmental risk factors for heat illness are present.

All Directly Affected Employees (including supervisory) shall be trained in :

- Environmental and personal risk factors for heat illness, as well as the added burden of heat load on the body caused by exertion, clothing, and personal protective equipment and methods used to control them (i.e., fans, air horns, canopies for the creation of shade in individual work areas, frequent breaks, work rotation, cooling head bands and towels, etc.)
- Procedures for identifying, evaluating, and controlling exposures to the environmental and personal risk factors for heat illness;
- The importance of pre/post work hydration and frequent consumption of small quantities of water, up to 4 cups per hour or more if needed by the employee when the work environment is hot and employees are likely to be sweating more than usual in the performance of their duties.
- For every 4 cups of water, one cup of electrolyte replenishing drink (Gatorade, Squincher, etc.) is required. Squincher will be provided by TEI at no cost to the employee.
- Importance of acclimatization;
- Different types, signs, and symptoms of heat illness;
- Importance of immediately reporting symptoms or signs of heat illness in themselves or in coworkers to their supervisor or site designated Emergency Responder.
- Procedures for responding to symptoms of possible heat illness, including how emergency medical services will be contacted and provided, should they become necessary.
- TEI's procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider.

Training for Project Managers & Supervisors of Affected Employees

Prior to supervising employees performing work that should reasonably be anticipated to result in exposure to the risk of heat illness, effective training on the following topics shall be provided:

- Information as detailed above in employee training requirements.
- Procedures the supervisor shall follow to implement the provisions of this program.
- Procedures the supervisor shall follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures.
- How to monitor weather reports and how to respond to hot weather advisories.

Training Documentation

Training shall be documented to include:

- Topic of the training
- Date of the training
- Person(s) providing the training
- Legible list of employees participating in the training along with their signature

Retention of the training records shall be according to TEI's record retention guidelines

Types of Heat Illness and First Aid

There are several types of heat-related illness. The following section will explain the symptoms, causes and first aid procedures for each type of heat-related illness.

All signs or symptoms of heat illness should be reported to a supervisor immediately. If a supervisor observes, or any employee reports, any signs or symptoms of heat illness in an employee, the supervisor shall take immediate action proportionate to the severity of the illness. If the signs or symptoms are indicators of severe heat illness (such as, but not limited to, decreased level of consciousness, staggering, vomiting, disorientation, irrational behavior or convulsions), emergency response procedures shall be implemented.

An employee exhibiting signs or symptoms of heat illness shall be monitored and shall not be left alone or sent home without being offered onsite first aid and/or being provided with emergency medical services.

Heat Stroke

Heat stroke is the most serious heat-related disorder. It occurs when the body becomes unable to control its temperature; the body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 106 degrees Fahrenheit or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not given.

Symptoms:

- Hot, dry skin or profuse sweating
- Hallucinations
- Chills
- Throbbing headache
- High body temperature
- Confusion/dizziness
- Slurred speech

First Aid:

- Contact emergency medical services and notify supervisor.
- Move the individual to a cool, shaded or air conditioned area.
- Cool the individual using methods such as:
 - Loosening or removing clothing
 - Soaking their clothes with water.
 - Spraying, sponging, or showering them with water.
 - Fanning their body.

Heat Exhaustion

Heat exhaustion is the body's response to an excessive loss of water and salt, usually through excessive sweating. Workers most prone to heat exhaustion are those that are elderly, have high blood pressure, and those working in a hot environment.

Symptoms:

- Heavy sweating
- Extreme weakness or fatigue
- Dizziness, confusion
- Nausea
- Clammy, moist skin
- Pale or flushed complexion
- Muscle cramps
- Slightly elevated body temperature
- Fast and shallow breathing

First Aid:

- Contact emergency medical services and notify supervisor.
- Move individual to a cool, shaded or air conditioned area and allow them to rest.
- Encourage individual to drink water or other cool, nonalcoholic and non-caffeinated beverages.
- Cool the individual using methods such as:
 - Loosening or removing clothing
 - Soaking their clothes with water
 - Spraying, sponging, or showering them with water
 - Fanning their body

Heat Syncope

Heat syncope is a fainting (syncope) episode or dizziness that usually occurs with prolonged standing or sudden rising from a sitting or lying position. Factors that may contribute to heat syncope include dehydration and lack of acclimatization.

Symptoms:

- Light-headedness
- Dizziness
- Fainting

First Aid:

- Contact emergency medical services and notify supervisor.
- Have individual sit or lie down in a cool, shaded or air conditioned area and allow them to rest.
- Encourage individual to drink water or other cool, nonalcoholic and non-caffeinated beverages.

Heat Cramps

Heat cramps usually affect workers who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture levels. Low salt levels in muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion.

Symptoms:

- Muscle pain or spasms usually in the abdomen, arms, or legs.

First Aid:

- Stop all activity, and sit in a cool place.
- Drink clear juice or a sports beverage.
- Do not return to strenuous work for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention if any of the following apply:
 - The worker has heart problems.
 - The worker is on a low-sodium diet.
 - The cramps do not subside within one hour

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather.

Symptoms include:

- Heat rash looks like a red cluster of pimples or small blisters.
- It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

First Aid:

- Work in a cooler, less humid environment when possible.
- Keep the affected area dry.
- Dusting powder may be used to increase comfort

Minimum Heat Illness Prevention Requirements

The following basic requirements apply to all employees while working where environmental risk factors for heat illness are or could be present.

- All employees shall be identified on the daily Task Hazard Analysis (THA or JHA – Job Hazard Analysis) who are required to work where environmental factors for heat illness are present.
- Training shall be provided for all potentially impacted employees working where environmental risk factors for heat illness are present and their supervisors. Training information shall include but not be limited to the topics listed in the training section of this written program.
 - All potentially impacted employees, and supervisors who directly supervise these employees, must be trained on the risks and prevention of heat illness, including how to recognize symptoms and respond when they appear.
- TEI shall provide employees with access to potable drinking water that is clean and maintained through individual dispensers, individual water bottles, faucets, or drinking fountains. Our supervisors are responsible for providing continuous water to all employees and ensuring employees have properly marked dispensable cups or bottles to obtain clean water.
 - Where TEI cannot otherwise supply or replenish employees' water continuously (e.g., with a mobile crew located off-site), it shall provide water in sufficient quantity at the beginning of each shift.

- Drinking water in the quantity of 1 quart per hour shall be made available at all times for each employee for the duration of the entire shift while working outdoors in the heat, or in conditions that subject employees to radiant heat.
- Supervisors shall remind employees to drink frequently and this topic will be addressed during the daily THA and during weekly Toolbox Talks
- The amendment adds that the water be fresh, pure, suitably cool, and provided free of charge to employees. Further, water must be located as close as practicable to the areas where employees are working,
- Employees shall have access to a shaded area to prevent or recover from heat illness symptoms and where they can take their rest breaks. The importance of taking rest breaks and recognizing when a preventative recovery period is needed allowing employees to cool down shall be addressed during the THA.
- In the event an employee feels discomfort from the heat, a preventative recovery period is needed to allow the employee to cool down and prevent the onset of heat illness.

Supervisors and employees shall carry radios or other means of communication (i.e., cell phone) to ensure that emergency services can be called. Verification that the radios or other means of communication are functional at the work site shall be carried out prior to each shift and during the daily THA.

Controlling & Addressing Various Work & Risk Factors

When composing the daily or task specific THA the supervisor shall take into consideration the following:

Body Heat – Losses & Gains

Heat build-up inside the body from physical work activities is the major source of heat load. In combination with this, working where the environmental and personal risk factors listed below are present, creates an even greater possibility that heat illness could occur.

The body loses and gains heat in various ways. These include:

- **Evaporation** - the loss of heat through sweating. High relative humidity reduces this heat loss and thus reduces the body's main cooling mechanism. Therefore, during periods of high relative humidity there is a greater risk of developing Heat Illness
- **Radiation** - the transfer of heat through space. The body loses or radiates heat to surrounding surfaces if the body is hotter than these surfaces. The body can gain heat from these surfaces if they are hotter than the body.
- **Convection** - the transfer of heat in a moving fluid like air. Air flowing past the body can cool the body if the air temperature is cooler than about 95 °F. The body can gain heat through convection if the air is hotter than about 95 °F.
- **Conduction** - the transfer of heat between surfaces touching each other. The body can lose heat directly through the skin if surfaces it touches (i.e., clothes, equipment, ground) are cooler than the skin. The body can gain heat through conduction if the surfaces it touches are hotter than the skin.

Risk Factors:

Heat build-up inside the body from physical work activities and there duration, along with required PPE (i.e., Tyvek Suit, FR Clothing, Clothing Color, etc.) are the major sources of heat load. In combination with this, working where the environmental and personal risk factors listed above are present, creates an even greater possibility that heat illness could occur.

Environmental risk factors can increase the external heat load on the body. Personal risk factors may increase an individual's susceptibility to developing heat illness. For example, not drinking enough water or drinking alcohol can both cause dehydration. Other personal risk factors which may increase the risk of heat illness include drug use, age, previous heat illness, excessive weight of the person, and poor levels of fitness. They can also affect an individual's ability to acclimatize or adapt to working in hot or warm conditions.

Heat Safety Supervisor's Daily Checklist

To assist you with your daily checklist and plan ask first:

- Have you reviewed TEI's Safety Bulletin #3 on Heat Illness Prevention?
- Have you downloaded and referenced OSHA's Heat Safety App?

☐ **WATER**

- Is there plenty of fresh, cool drinking water located as close as possible to the workers?
- Is there a plan for refilling our coolers with plenty of bottled water throughout the day?

☐ **SHADE AND REST**

- Is a shade structure readily available at all times (regardless of the weather) for workers to rest and cool down?
- Is the shade structure up and ready when the weather forecast is 80°F or higher?
- Do you have a plan in place for checking the weather forecast?

☐ **TRAINING**

- Have workers been trained to recognize and prevent heat illness BEFORE they start working outdoors?
- Can workers identify symptoms of heat illness?
- Is there a special plan in place to allow workers to get used to the heat?

☐ **EMERGENCY PLAN**

- Does everyone know who to notify if there is an emergency?
- Can workers explain their location if they need to call an ambulance?
- Does everyone know who will provide first aid?
- Are TEI's Heat Stress Kit and Trauma Bags readily available for use for a emergency heat related illness by responders?

☐ **WORKER REMINDERS**

Have workers been reminded to:

- Drink water frequently?
- Rest in the shade for at least 5 minutes as needed?
- Look out for one another and immediately report any symptoms?



The work can't get done without them.



HEAT ILLNESS PREVENTION

HEAT ILLNESS CAN BE PREVENTED

OSHA has identified two (2) primary factors contributing to workers becoming overheated while at work

1. The environmental conditions in which they work;
2. The internal heat generated by physical labor.

Heat-Related illnesses occur when the body is not able to lose enough heat to balance the heat generated by physical work and external heat sources. Weather conditions combined with FR Clothing requirements are the primary external heat sources for our outdoor workers while for our inside workers it can be radiant heat from equipment combined with the level of FR clothing or other Personal Protective Equipment (PPE) required to safely perform the job.

In an effort to combat these heat-related illnesses TEI is providing training and tools to assist our Foremen and employees in this venture, the first having been an e-mail (sent out 06/03/16 from Kayla Caudill) providing you with a link to OSHA's Heat Stress App for Android or Apple Devices. In case you missed it, here is the link:

https://www.osha.gov/SLTC/heatillness/heat_index/heat_app.html

This is not only a useful tool for work but also for your family. Now that you have the heat index tool, how do you use it?



Using the Heat Index

Outdoor workers who are exposed to hot and humid conditions are at risk of heat-related illness. The risk of heat-related illness becomes greater as the weather gets hotter and more humid. This situation can be more serious for new employees who are arriving at your work site and have not had a chance to adapt to working in the heat or those returning from an extended period of time off (i.e., vacation).

For our employees working outdoors in hot weather, both air temperature and humidity affect how hot they feel. The "Heat Index" is a single value that takes both temperature and humidity into account. The higher the heat index, the hotter the weather feels, since sweat does not readily evaporate and cool the skin. The heat index is a better measure than air temperature alone for estimating the risk to workers from environmental heat sources.

		Relative Humidity (%)																		
		40	45	50	55	60	65	70	75	80	85	90	95	100						
Air Temperature °F	110	118													Heat Index (Apparent Temperature)					
	108	108	112																	
	106	104	108	112																
	104	102	106	110	114															
	102	100	104	108	112	116														
	100	98	102	106	110	114	118													
	98	96	100	104	108	112	116	120												
	96	94	98	102	106	110	114	118	122											
	94	92	96	100	104	108	112	116	120	124										
	92	90	94	98	102	106	110	114	118	122	126									
	90	88	92	96	100	104	108	112	116	120	124	128								
	88	86	90	94	98	102	106	110	114	118	122	126	130							
	86	84	88	92	96	100	104	108	112	116	120	124	128	132						
	84	82	86	90	94	98	102	106	110	114	118	122	126	130						
	82	80	84	88	92	96	100	104	108	112	116	120	124	128						
	80	78	82	86	90	94	98	102	106	110	114	118	122	126						

With Prolonged Exposure
and/or Physical Activity

Extreme Danger
Heat stroke or sunstroke highly likely
Danger
Sunstroke, muscle cramps, and/or heat exhaustion likely
Extreme Caution
Sunstroke, muscle cramps, and/or heat exhaustion possible
Caution
Fatigue possible

Important Note

The heat index was devised for shady, light wind conditions, and exposure to full sunshine can increase heat index values by up to 15 degrees Fahrenheit. To account for solar load, added precautions are recommended. See Protective Measures (pg. 2)

Depending on the heat index value, the risk for heat-related illness can range from lower to very high to extreme. As the heat index value goes up, incorporate additional preventive measure to protect yourself and your workers. We have provided the quick reference chart below to be used with the Heat Index Chart provided on pg. 1 or the Heat Index App from OSHA's web page, the link to which is also found on pg. 1.

The following is based on OSHA's Heat Illness Prevention Guidelines

Heat Index	Risk Level	Protective Measures (to be re-evaluated as the work shift progresses and the temperature and humidity change)
< 91°F	Lower (Caution)	• Provide drinking water (water is to be cooler than the ambient temperature but not so cool as to cause discomfort OSHA recommends 50°F to 60°F when possible) • Ensure adequate medical services are available and location known • Plan ahead for times when heat index is higher (as work shift progresses) • Encourage workers to wear sunscreen • Acclimatize workers, especially those returning after days off or new hires • If workers are required to wear heavy protective clothing (i.e., FR Rated, blast suits), PPE (i.e., face shield, rubber gloves & sleeves), or perform continuous strenuous activity or work in the direct sun, additional precautions as listed below should be taken. Discuss these in your Daily Tailboard before starting. Get your workers input. • Provide shade to allow your workers to get in out of the sun for breaks (i.e., job trailer, canopy).
91°F to 103°F	Moderate	In addition to the steps listed above: • Remind workers to drink water often (a minimum of about 4 cups per hour). Under most circumstances, fluid intake should not exceed 6 cups per hour or 12 quarts per day. This makes it particularly important to reduce work pace, reschedule work, or enforce work/rest schedules with all workers. • Review heat-related illness topics with workers: how to recognize, how to prevent, and what to do if someone gets sick • Schedule frequent breaks in cool, shaded area and monitor your workers closely • Acclimatize workers • Set up buddy system/instruct supervisors to watch workers for signs of heat-related illness and report and treat immediately • When possible, reschedule work activities to a time when the heat index is lower • Establish with workers, and enforce, work/rest schedules
103°F to 115°F	High	In addition to all steps listed above: • Alert workers of high risk conditions • Limit physical exertion (i.e., use mechanical means or worker rotation, slow work pace) • Watch and communicate with your workers at all times
> 115°F	Very High to Extreme	In addition to all steps listed above: • Alert workers of extreme heat hazards, especially those whose tasks involve physical exertion • Move essential work tasks to the coolest part of the work shift; consult with your project manager or department head regarding earlier start times if needed. Strenuous work tasks and those requiring the use of heavy or non-breathable clothing or impermeable chemical protective clothing should not be conducted when the heat index is above 115°F • Develop and enforce protective work/rest schedules based on this high level of alert • Stop work if essential control methods are inadequate or unavailable

The heat index is a simple tool and a useful guide to help us make decisions about protecting our workers in hot, humid weather. It does not account for certain conditions that contribute additional risk, such as an individual's overall physical condition, an individual's health issues (i.e., medications, cardio, diabetes, etc.) nor does it take into consideration an individual's caffeine intake for the day or previous night's alcohol consumption. Consider taking steps at the next highest level to protect workers from the added risks posed. Remember working in the direct sun can add up to 15°F to the heat index value as would workers required to wear heavy clothing or protective gear.

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
	Origination	Safety Div.	Safety Div.	N/A	04/2015
01	- Removed the Vice President's Duties - Updated responsibilities of Division Managers & Project Managers - Added Training Requirements for Project Managers - Added Heat Safety – TEI Supervisors Daily Checklist Form - Inserted Safety Bulletin on Heat Illness Prevention	Safety Div.	Management w/Safety	09/2020	09/2020
02	Added electrolyte replenishment info	Safety Div.	Safety Dept.	01/2022	01/2022



Thompson Electric, Inc.

OSHA INJURY/ILLNESS RECORDKEEPING GUIDELINES

2016

Safety Department

Policy

This policy and its related procedures apply to all departments of Thompson Electric, Inc. All employees of Thompson Electric (herein referred to as TEI) are required to comply with the provisions of this policy and procedure. Any deviation, unless spelled out specifically in this policy, requires the permission of the Safety Director and the President. This policy establishes the criteria for the creation and retention of all written records for work-related fatalities, injuries, and illnesses that are work-related, is a new case, and meets one or more of the general recording criteria established within this policy and its related procedures.

Purpose

Thompson Electric, Inc. will maintain and retain accurate written records as set forth by the Occupational Safety and Health Act of 1970 and Part 1904.

- The Occupational Safety and Health Act of 1970 require TEI to record and report work related injuries, illnesses and fatalities. These records determine TEI's total recordable incident rate (TRIR) and days away, restricted and/or transferred (DART) rate.
- The Total Recordable Incident Rate (TRIR) is determined by multiplying the number of recordable injuries/illnesses/fatalities by 200,000 (BLS established formula - one hundred workers for one year) then dividing by the actual number of hours worked for a calendar year.
 - Employees that are of a temporary status but still work under TEI's **direct** supervision are considered by OSHA to be the "responsibility" of TEI and therefore their injuries/illnesses are to be recorded on TEI's yearly OSHA 300 log. Likewise their hours worked are to be included in TEI's Total Hours Worked for purposes of determining our TRIR and DART rates.
 - **Do Not** include any subcontractor employees that are under their own company's direct supervision.
 - The calculation for TRIR is:

$$\frac{N \text{ (recordable cases)} \times 200,000}{\text{YTD Hours Worked}}$$

- The calculation for DART is:

$$\frac{\text{Total Number of DART Incidents} \times 200,000}{\text{YTD Hours Worked}}$$

OSHA Recordability vs. Workers Compensation

Recordable injury, illness and fatality cases **do not** in any way determine compensability under workers' compensation. Sometimes there is little relationship between the two. Each case must be investigated and evaluated on its own facts and merits. Transfer to another job in order to accommodate modified work capacity is not by itself recordable. Likewise, absence from work as a decision by the employee may not make a case recordable or compensable. If there is a question regarding recordability, contact the Safety Director to assist with appropriate reporting and processing.

- An injury, illness or fatality is work-related if the event or exposure in the work environment either caused or contributed to the resulting condition or significantly aggravated a pre-existing injury or illness.

OSHA Recordability vs. Workers Compensation (continued)

- TEI requires a Physician or other Licensed Health Care Practitioner's (PLHCP) diagnosis for work related injury, illnesses or fatality. Because of the long term implications all cases will be reviewed by the Safety Director, Treasurer and President.
- A pre-existing injury or illness is significantly aggravated when an event or exposure in the work environment results in any of the following (which otherwise would not have occurred). These include, but are not limited to the following:
 - Death
 - Loss of consciousness
 - Days away, days restricted or job transfer
 - Medical treatment beyond first aid
 - Significant injury or illness diagnosed by a PLHCP
- Work related cases involving cancer, chronic irreversible disease, a fracture or cracked bone, or a punctured eardrum must always be recorded at the time of the diagnosis by a PLHCP, even if medical treatment, days away or work restrictions are not recommended nor defined on the involved employee's medical documentation or release to return to work.
- Work relatedness is presumed for injuries, illnesses or fatalities resulting from events or exposures occurring in the work environment.
- Exceptions – the following are recognized by OSHA's record keeping guidelines as NOT Work-Related:
 - At the time of the injury or illness, the employee was present in the work environment as a member of the general public rather than as a team member.
 - The injury or illness results involved signs or symptoms that surface at work, but results solely from a non-work-related event or exposure that occurs outside the work environment.
 - The injury or illness results solely from voluntary participation in a wellness program or in a medical, fitness or recreational activity such as blood donation, physical examination, flu shot, exercise class, etc.
 - The injury or illness is solely the result of an employee eating, drinking, or preparing food or drink for personal consumption (whether purchased on the employer's premises or brought in). For example, if an employee is choking on food while in the employer's establishment, the case would not be considered work-related.
 - The injury or illness is solely the result of an employee doing personal tasks (unrelated to their employment) at the establishment outside of the employee's assigned work hours.
 - The injury, illness or fatality is solely the result of personal grooming, self-medication for a non-work-related condition, or is intentionally self-inflicted.
 - The injury, illness or fatality is caused by a motor vehicle accident that occurs in a company parking lot or company access road while the employee is commuting to or from work.
 - The illness is the common cold or flu (NOTE: contagious diseases such as Hepatitis A, B, C are considered work-related if the employee is infected at work).
 - The illness is a mental illness. Mental illness will not be considered work-related unless the employee voluntarily provides TEI with an opinion from a physician or other PLHCP with appropriate training and experience stating the employee has a mental illness that is work-related. PLHCP in this case would be a psychiatrist, psychologist or psychiatric nurse practitioner.

Travel Status

- An injury or illness that occurs while an employee is on travel status is work-related if it occurred while the employee was engaged in the work activities in the interest of TEI.
 - Activities that are considered “in the interest of TEI” would include travel to and from customer locations (i.e., work site), conducting job tasks (i.e., picking up the company mail), and entertaining or being entertained to transact, discuss or promote business (with the entertainment being at the direction of TEI Management).
- Hotel/Motel/Overnight Accommodations is considered home away from home (not recordable).
- Detour for personal reasons is not work-related (not recordable).

Work at Home

- Injuries and illnesses that occur while an employee is working at home are work-related if they occur while the employee is performing work for pay or compensation in the home and they are directly related to the performance of work rather than the general home environment.

Recordability

➤ New Case

- A case is new if:
 - The employee has not previously experienced a recordable injury or illness of the same type that affects the same part of the body; or
 - The employee previously experienced a recordable injury or illness of the same type that affects the same part of the body, but had recovered completely and a specific event caused the signs and symptoms to reappear.

➤ Medical Treatment

- Medical treatment is the management and care of a patient to combat disease or disorder. Medical treatment does not include:
 - Visits to a PLHCP solely for observation or counseling.
 - Diagnostic procedures such as x-rays, blood tests and medications used for diagnostic purposes (such as eye drops to dilate the pupils).
 - First Aid as defined in 29 CFR 1904.7(b)(5)(ii).

➤ Restricted Work Cases

- Record if the case involves one or more days of restricted work or job transfer.
- Check the box for restricted/transfer cases and count the number of calendar days.
- Do not include the day of the injury or illness.
- A Job Transfer occurs when :
 - An injured or ill employee is assigned to a job other than his or her regular job for part of the day.
 - A case is recordable if the injured or ill employee performs his or her routine job duties for part of a day and is assigned to another job for the rest of the day.
- Restricted work activity occurs when:
 - An employee is kept from performing one or more routine functions (work activity that an employee performs at least once a week) of his/her work scope (i.e., job).
 - An employee is kept from working a full scheduled workday.
 - A PLHCP recommends either of the above.

Recordability (continued)

➤ Days Away Cases

- Record if the case involves one or more calendar days the employee was unable to work (include weekend days, holidays, vacation days, etc.):
 - Do not include the day of the injury/illness
 - Cap day count at 180 days away and/or days restricted (total of both not to exceed 180 days)
 - May stop day count if the employee leaves TEI for a reason unrelated to the injury or illness.
 - If a medical (by a PLHCP) opinion exists, TEI must follow that opinion (i.e., employee is removed for 5 days from work).

➤ Recording a Fatality

- Work-related fatalities must be recorded by checking the box for cases resulting in deaths.
- Work-related fatalities must be reported to OSHA within 8 hours. This reporting process will be overseen by the Safety Director and the Treasurer.

➤ Medical Removal

- If an employee is medically removed under the medical surveillance requirements of an OSHA standard (i.e., Lead, Cadmium, Arsenic, etc.) you must record the case.
 - The case is recorded as either one involving days away from work or days of restricted work activity.
 - If the case involves voluntary removal below the removal levels required by the standard, the case need not be recorded.

➤ Hearing Loss

- A case must be recorded when a confirmed standard threshold shift meets two criteria. First you must have a 10 db shift in one or both ears from the baseline (measured at 2000, 3000, and 4000 hz). Second the shift must make the employees hearing greater than 25 db from audiometric zero. If both criteria are satisfied on one or both ears, then the case is recordable.

➤ Bloodborne Pathogens

- Record splashes or other exposures to blood or potentially infectious material (i.e., when performing 1st Aid/CPR or performing post-accident decontamination) if it results in a diagnosis of a bloodborne disease or meets the general recording criteria.
 - Reference TEI's Bloodborne Pathogen Exposure Control Plan for additional guidelines.

Administration

➤ OSHA Form 300 – Log of Work-Related Injuries, Illnesses and Fatalities

- Recordable cases must be entered on the OSHA Form 300 within 7 calendar days of receiving information that a recordable case occurred.
- Each column of the OSHA Form 300 must be totaled at the bottom at year end.
- Do not enter the name of an employee on the OSHA Form 300 for *Privacy Concern Cases* (see directly below for guidance on this). Enter "Privacy Case" in the name column. The TEI Human Resources Representative will maintain a separate confidential list of the case numbers and employee names of "privacy concern" cases. Make sure to fill out the form completely and accurately including the description in column F (include the illness or injury, parts of body affected, and object/substance that directly injured or made person ill).

Administration (continued)

- Privacy Protection – Privacy Concern Cases are:
 - Mental illness
 - Employee voluntarily requests to keep their name off for other illness causes.
 - Sharps and needlestick injuries that are contaminated with another person's blood or other potentially infectious material.
 - Hepatitis, tuberculosis, HIV infection.
 - An injury or illness to an intimate body part or reproductive system.
 - An injury or illness resulting from sexual assault.
 - Names must be removed when sharing information with people not authorized by the rule. Exceptions are when that information is needed to process Workers' Compensation Claims, an internal or external consultant performing an evaluation of the safety and health program and a public health authority or law enforcement agency.
- When there are multiple work locations TEI may opt to keep a separate OSHA Form 300 for each work location/site that is or is expected to be in operation for more than one year.
 - One OSHA Form 300 may shall be kept for all short term (less than one year) jobs.
 - Either way, each employee must be linked with one particular job and/or OSHA Form 300.
- Covered Employees. The following must be included on the TEI OSHA Form 300 log:
 - All employees on the payroll, including part-time and seasonal.
 - Employees not on our payroll, who are supervised on a day-to-day basis (Temporary Services employees working for TEI).
 - Exclude self-employed and partners (if applicable)
 - Temporary help agencies should not record the cases experienced by temporary workers who are supervised by TEI.
- OSHA Form 300A – Summary of Work-Related injuries and Illnesses
 - A company executive must certify the OSHA 300A Summary Form. That individual must be:
 - An owner of the company
 - An officer of the corporation
 - The highest ranking company official working at the establishment.
 - The summary cannot be certified a safety representative.
 - Must post for a 3 month period, from February 1st to April 30th each year for the year proceeding the posting period and then maintain the summary on file.
 - The summary must be posted in a conspicuous location that is visible to employees.
- OSHA Form 301 (or equivalent) – Injury and Illness Incident Report
 - TEI's Injury/Illness/Near Miss forms together meet the criteria for "equivalent" to OSHA's Form 301 and are to be used as supporting documentation for every OSHA Form 300 entry.
 - The OSHA Form 301 (or equivalent) must be completed within 7 calendar days of receiving information that a recordable injury or illness has occurred.

Retention and Updating

- All forms are to be retained for 5 years following the year that they cover
- Update the OSHA Form 300 only during this retention period (i.e., change in employee status such as restricted duty to lost time, medical only to restricted duty).
 - Always update the OSHA Form 300 of the change in employee status in the year the actual injury or illness took place in.
- OSHA Summary 300A and the OSHA Form 301 do not need to be updated to reflect the change in employee status.

Employee Involvement

- TEI must provide limited access to injury and illness records to employees, former employees or their personal and authoritative representatives (i.e., union representatives, PLCHP, etc.)
- TEI must provide one free copy of the OSHA Form 300 by the end of the next business day following the authorized request.
- TEI must provide one free copy of the OSHA Form 301 (or company equivalent) to employees, former employees or personal representatives by the end of the next business day.
- TEI must provide copies of OSHA Form 301 (or company equivalent) to “Authorized” representative within 7 calendar days. Provide only “information about the case) section of the form.

Prohibition against Discrimination

- OSHA prohibits the employer from discriminating against an employee for reporting a work-related injury, illness or fatality.
- OSHA also protects an employee who files a safety and health complaint, asks for access to the part 1904 records, or otherwise exercises any rights afforded by OSHA.

Fatality/Catastrophe Reporting

- Report verbally within 8 hours to an OSHA Area Office
 - Work related fatality
 - Incident involving 3 or more in-patient hospitalizations
 - Fatal heart attacks at work
- **Do Not** Report:
 - Highway or public street motor vehicle accidents that occur “Outside of a construction or traffic established work zone”
 - Commercial airplane, train, subway, or bus accidents.
 - If more than 30 days post-incident.

Providing Records to Government Officials

- TEI must provide copies of the records within 4 business hours
- Use the business hours of the establishment where the records are located (i.e., office is in different time zone from work location).



Thompson Electric, Inc.

Lead Awareness

2012

Introduction

When absorbed into the body in certain doses lead is toxic. It can be absorbed into the body by inhalation and ingestion. Except for certain organic lead compounds not covered by 29 CFR 1926.20, lead is not absorbed significantly through the skin. When scattered through the air as a dust, fume, or mist, lead can be inhaled and absorbed through the lungs and upper respiratory tract. Inhalation of airborne lead is generally the most common source of occupational lead absorption. Lead can also be absorbed through the digestive system if it enters the mouth and is ingested.

A significant portion of the lead inhaled or ingested gets into the blood stream. Once in the blood stream, lead is circulated throughout the body and is then stored in various organs and body tissues. Some of this lead is quickly filtered out of the body and excreted, but some remains in the blood and tissues. As exposure continues, the amount stored will increase, if the body is absorbing more lead than it is excreting. The lead stored in the tissues can slowly cause irreversible damage, first to individual cells, then to organs and whole body systems.

Lead exposure most generally occurs in construction activities that involve the disturbance of lead or lead containing materials. Additionally, some construction related activities such as the transport, disposal, storage, or containment of lead or lead containing materials on construction sites can also contribute to employee lead exposure.

This safety policy and procedure covers, at a minimum, the following job activities within Thompson Electric:

- Flame-torch cutting, welding, the use of heat guns, sanding, scraping and grinding of lead painted surfaces in repair, reconstruction, dismantling, and demolition work;
- Use of torches and heat guns, and sand, scraping, and grinding lead-based paint surfaces during remodeling or abating lead-based paint;
- Spray painting with lead based paint; and
- Maintaining process equipment.

Thompson Electric will evaluate our worksites for the presence of Lead fumes and dust, which may be generated during the above stated work procedures. These results will be used to determine the appropriate Engineering, Administrative and Personal Protective Equipment controls.

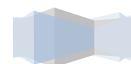
Policy

Because it is the policy of Thompson Electric to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public we have adopted the following policy. Employees, subcontractors, and supplemental labor employee, will not...

...perform any Lead related job activity without the proper training, medical surveillance and proper Personal Protective Equipment (PPE). This shall be addressed in a site specific Lead Compliance Program which shall be reviewed and enforced by Management.

Where Lead hazards exist that cannot be eliminated, then additional engineering practices, administrative practices, safe work practices, personal protective equipment (PPE), and proper training regarding Lead in Construction will be implemented. These measures will be implemented to minimize those hazards to ensure the safety of employees, our host employer *and the public*.

It is the responsibility of each officer, manager, supervisor and employee to ensure implementation of Thompson Electric's safety policy and procedure on lead safety. It is also the responsibility of each employee to report immediately any unsafe act or condition to his or her immediate supervisor or Competent Person.



Responsibilities

The Vice President is responsible for:

- The Vice President will ensure compliance with this safety policy and procedure through the auditing process as outlined in Thompson Electric's written Discipline in Support of Safety Policy Statement.
- The Vice President will provide prompt assistance to the Field Superintendent, Supervisory Personnel, and others as necessary on any matter concerning this safety policy and procedure. Additionally, the Vice President will provide consultative and audit assistance to ensure effective implementation of this safety policy and procedure.
- The Vice President may delegate the responsibility of various aspects of the Lead Safety Program to a Competent Person. However, the Vice President's ultimate responsibility for his/her aspects of the program cannot be delegated.

Field Superintendent is responsible for:

- Ensuring that ANSI and NIOSH approved PPE and supplies are available to protect employees from lead exposure. Also, obtaining and coordinating all required training for Affected Employees.
- He will designate Competent Persons and Qualified Persons for those work activities affected by this safety policy and procedure.
- The Field Superintendent will develop, or secure, all required training under this policy and procedure.
- The Field Superintendent will be responsible for providing training, expertise, and guidance to Competent Persons and Qualified Persons to perform lead exposure assessments. The Field Superintendent may appoint and/or designate certain individuals to be Qualified Persons.

The Designated Human Resources Representative is responsible for:

- Preparing and maintaining a written Employee Education and Training Record upon successful completion of training and any retraining (80% pass/fail criteria). These documents will include, but not be limited to;
 - Names or other identities of employees trained;
 - Signature of the person receiving the training;
 - Date of the training or retraining;
 - Specific topics (i.e., class curriculum) addressed during the training or retraining session;
 - Signature of the person, or company, conducting the training or retraining.
 - The original document will be kept with the employee's records at Thompson Electric's main office and a copy of this training record will be kept in the "Safety File" at the work site, as appropriate
- Making the written Lead Safety Plan and any applicable PSM Plans/Documents available to employees, OSHA & NIOSH representatives.
- Retention and, if applicable, distribution, of all medical records (i.e., confidential) for the specific time periods outlined in this plan to authorized representatives.



Supervisory Personnel

- The designated supervisor will ensure that no lead-related task/operation is performed without the appropriate controls being in place as prescribed in this safety policy and procedure and the site specific Lead Compliance plan. He/She will also assist “Competent” and “Qualified” persons as requested in the performance of their duties.
- With the approval of the Field Superintendent, the designated supervisor may delegate the responsibility of various aspects of the Lead Safety Program and the site specific Lead Compliance Plan to a Qualified Person (as approved by the Field Superintendent). However, the Supervisor’s ultimate responsibility for his/her aspects of the program cannot be delegated

Competent Person

- Competent Person(s) will be responsible for identifying existing and potential Lead hazards in the workplace. They will also be responsible for, and have complete authority to, take prompt corrective measures to eliminate or control Lead hazards.
- The designated Competent Person must be able to:
 - Determine, prior to beginning a job, whether Lead is present in the workplace.
 - Establish regulated areas and ensure that access to and from those areas is limited to “Authorized” employees.
 - Ensure the adequacy of any employee exposure-monitoring required by the standard.
 - Ensure that all employees exposed to airborne Lead levels above the PEL wear the appropriate PPE (personal protective equipment) and are trained to use appropriate methods to control Lead exposure.
 - Ensure that proper hygiene facilities are provided and that workers are trained to use these facilities and that their proper usage is strictly enforced.
 - Ensure that required engineering controls are implemented, maintained in proper operating condition, and function properly.
- With the approval of the Field Superintendent, the Competent Person may delegate the responsibility of various aspects of the Lead Safety Program to a Qualified Organization (as approved by the Field Superintendent). However, the Competent Person’s ultimate responsibility for his/her aspects of the program cannot be delegated.

Qualified Person

- Qualified Person(s) shall be responsible for assisting with the Site Specific Lead Compliance Plan in accordance with this safety policy and procedure and established exposure assessment protocols.
- Immediately reporting any violations of the Site Specific Lead Compliance Plan to the designated Supervisor and the Field Superintendent.

Employees

- Complying with all applicable guidelines contained in this safety policy and procedure and the Site Specific Lead Compliance Plan.
- Report any unsafe act associated with this safety policy and procedure to their immediate supervisor.
- Employees who are assigned PPE are to keep them available and in good working order at all times and to have them replaced when they become worn or unsafe.



General Personnel (not otherwise classified)

- Personnel employed by Thompson Electric and all contractors and subcontractors working at any and all Work Sites operated by Thompson Electric are required to comply with the procedures and work practices outlined in this Lead Safety Plan. The Vice President is responsible for ensuring that said individuals/organizations, operating under the supervision of Thompson Electric, are informed of and adhere to this Lead Safety Program.

Training for Outside Personnel

- Outside personnel and sub-contractors will be trained as a Thompson Electric Authorized Employee or will be provided with a Thompson Electric Authorized Employee escort to assist in the correct procedures of the outside service personnel's Lead Safety Plan.

Definition

Action Level (AL) – The level at which an employer must begin certain compliance activities outlined in the standard. The action level, regardless of respirator use, for the lead in construction, standard is an airborne concentration of 30 ug/m³ calculated as an 8-hour time weighted average.

Authorized Person – Any person authorized, by Thompson Electric, and required by work duties to be present in regulated areas.

Carcinogen – A substance that causes cancer.

CAS Number – Number assigned by the Chemical Abstracts Service to identify a specific chemical.

Combustible Substance – A solid, liquid, or gas that will burn.

Construction Industry Work – All work involving Lead. This includes all building and building-related equipment maintenance and repair activities, demolition, remodeling, or new construction.

Corrosive Substance – A gas, liquid, or solid that causes irreversible damage to human tissue or containers.

Competent Person - Person designated by Thompson Electric to act on their behalf that is capable of identifying existing and potential Lead hazards in the workplace and the proper methods to control them in order to protect workers, and has the authority necessary to take prompt corrective measures to eliminate or control such hazards.

DOT – Department of Transportation. Federal agency that regulates the transportation of chemicals.

EPA – Environmental Protection Agency. Federal agency responsible for regulating environmental hazards.

HEPA – High-Efficiency Particulate Air Filter: A filter capable of trapping and retaining at least 99.97 % of mono-dispersed particles of 0.3 micrometers in diameter.

HHAG – Human Health Assessment Group of the federal EPA.

IARC – International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

Lead – Metallic lead, all inorganic lead compounds, and organic lead soaps.

Mg/m³ – Milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA – The Mine Safety and Health Administration. The federal agency that regulates mining. It also evaluates and approves respirators.



Mutagen – A substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NCI – National Cancer Institute. A federal agency that determines the cancer-causing potential of chemicals.

NFPA – National Fire Protection Agency. Classifies substances according to their fire and explosion hazard.

NTP – National Toxicology Program. Tests chemicals and reviews evidence for cancer...

ppm – Parts of a substance per million parts of air. It is a measure of concentration by volume in air.

Permissible Exposure Limit (PEL) – Airborne concentration of lead at 50 micrograms per cubic meter of air ($50 \mu\text{g}/\text{m}^3$) calculated as an 8 hour time weighted average.

Qualified Person – Person who has training and experience in air monitoring, exposure assessment, and workplace evaluations.

Regulated Area – An area clearly marked and posted, where an employee's exposure to airborne concentrations of Lead exceeds, or can reasonably be expected to exceed the permissible exposure limit (PEL).

TLV – Threshold Limit Value. Workplace exposure limit recommended by ACGIH.

Vapor Pressure – A measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Workplace Exposure Limits

The Permissible Exposure Limit (PEL) sets the maximum worker exposure to lead. No employee may be exposed to lead at airborne concentrations greater than fifty micrograms per cubic meter of air.

- **OSHA** - Occupational Safety and Health Administration. Adopts and enforces health and safety standards.
 - The legal airborne permissible exposure limit (PEL) for Lead over an 8 hour work shift is $0.05\text{mg}/\text{m}^3$.
- **NIOSH** - National Institute for Occupational Safety and Health. Tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA
 - The recommended airborne exposure limit is less than $0.10 \text{ mg}/\text{m}^3$ averaged over a 10 hour work shift.
- **ACGIH** - American Conference of Governmental Industrial Hygienists. It recommends upper limits (called Threshold Limit Values) for exposure to workplace chemicals.
 - The recommended airborne exposure limit is $0.15 \text{ mg}/\text{m}^3$ averaged over an 8-hour work shift.
- Lead is a **Teratogen** in humans. All contact with this substance should be reduced to the lowest possible level.



Employee Exposures Above the PEL

Based on available exposure data and OSHA recommendations, there are 3 groups of lead-related tasks or operations that **presume** employee lead exposure **above the PEL**. The levels are:

- Employee exposure between the PEL and 500 ug/m^3 with a respirator protection factor of 10. This includes, but is not limited to the following lead-related tasks/operations:
 - Manual demolition of structures;
 - Manual scraping, manual sanding, heat gun applications, power tool cleaning with dust collection systems.
 - Spray painting with lead based paint.
- Employee exposure above 500 ug/m^3 and less than 2500 ug/m^3 with a respirator protection factor between 10 and 50. This includes, but is not limited to the following lead-related tasks/operations:
 - Using lead containing mortar.
 - Lead burning.
 - Rivet busting.
 - Power tool cleaning with dust collection systems.
 - Clean up activities where dry expendable abrasives are used.
 - Abrasive blasting enclosure movement and removal.
- Employee exposure greater than 2500 ug/m^3 with a respirator protection factor greater than 50. This includes, but is not limited to the following lead-related tasks/operations:
 - Abrasive blasting, cutting, welding and torch burning on steel structures where lead containing coatings or paint are present.
- For those lead-related tasks/operations which presume lead exposures above the PEL, interim protection must be provided to employees until an employee assessment is completed. Interim protection measures include, but are not limited to:
 - Appropriate respiratory protection.
 - Appropriate Personal Protective Equipment and clothing.
 - Change areas.
 - Hand washing facilities.
 - Biological monitoring.
 - Training.

Training

- All levels of employees with potential job-related Lead exposure, Competent Persons and Qualified Persons shall be trained prior to the time of initial job assignment and annually in:
 - Specific hazards associated with their work environment.
 - Protective measures which can be taken against these hazards.
 - The danger of lead to their bodies and their families through cross contamination.
 - Employee rights under this safety policy and procedure and the OSHA Standard on Lead in Construction.
- All employees, Competent Persons and Qualified Persons will be trained prior to their initial job or reassignment. Additionally, refresher training shall be provided at a minimum annually.



- Competent Persons and/or Qualified Persons may receive additional training to conduct exposure assessments. This training shall include, at a minimum:
 - Air sample flow calibration.
 - Sample train set-ups.
 - Analytical procedures.
 - Air monitoring protocols.
 - OSHA reference methods.
 - Exposure calculations.
 - Exposure data statistical analysis.

Initial Exposure Assessment

If Lead may be present in any operation, then an initial exposure assessment must be made to determine whether an employee's exposure exceeds the action level (0.30 ug/m³ averaged over an 8 hour day). This initial assessment will document the exposure an employee would have without the use of respiratory protection.

- Reasons for believing that Lead is present include:
 - Any information, observations or calculation that would indicate employee exposure to Lead (i.e., MSDSs, past reports, relevant plans).
 - Any previous measurements of airborne Lead.
 - Any employee complaints or symptoms that may be attributable to lead exposure.
- The Initial Exposure Assessment **is not** required if:
 - Objective data is available which can conclusively demonstrate that no employee will be exposed in excess of the action level.
 - An exposure assessment has been conducted within the last 12 months for a project with very similar aspects as the project in question.
- This initial exposure assessment may be limited to a representative number of employees who are reasonably expected to have the highest exposure levels.
- The Table on the following page represents typical lead exposure levels for various lead-related work activities.



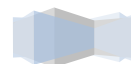
- Representative TWA (8) Exposure Levels in $\mu\text{g}/\text{m}^3$ with No Engineering Controls and Respiratory Protection.

Construction Activity	Exposure Level Used To Specify Controls
Open Abrasive Blasting	23,680
Open Abrasive Blasting In Full Containment	37,300
Vacuum Blasting	558
Welding, Cutting & Burning on Bridges	1,564
Other Welding, Cutting & Burning	973
Lead Burning	663
Spray Painting Lead-Based Paint	101
Hand Scraping	96
Removal & Replacement of Building Components	9
Manual Demolition of Building Components	77
Heat Gun Use	32
Chemical Stripping	15
Encapsulation	4
Power Tool Use (Housing Abatement Projects)	296
Power Tool Use (Other Paint Removal Projects)	1,314
Use of Lead Mortar	8
Soldering & Brazing	9
Use of Lead Mortar	663
Stained Glass Removal	79
Handling Lead Shot, Brick, or Sheet	16
Industrial Vacuuming	994
Cutting Lead Foil Panels	1
Reinsulation Over Existing Mineral Wood	90
Miscellaneous Enclosure Movement	1,156
Miscellaneous Abrasive Blasting/Repainting	1,904
Miscellaneous Remodeling Related Activities	76
Miscellaneous Lead Abatement Activities	8
Miscellaneous Steel structure Rehabilitation	262
Spray Painting Non-Lead-Based Paint	26
Brush Painting Non-Lead Based Paint	3



Air Monitoring & Monitoring Requirements Due to the Initial Exposure Assessment for Lead

- **Employee Exposures below the action level:** If the initial determination proves employee exposure is below the action level, further exposure determination need not be repeated unless there is a change in processes or controls.
- **Initial Employee exposures at or above the action level but at or below the PEL:**
 - Require monitoring every 6 months. This monitoring must be continued at the required frequency until at least 2 consecutive measurements, taken at least 7 days apart, are below the action level, at which time monitoring may be discontinued for that employee.
- **Employee exposures above the PEL** requires quarterly monitoring. This monitoring must continue until at least 2 consecutive measurements taken at least 7 days apart are at or below the PEL but at or above the action level. Thompson Electric must then repeat and continue monitoring every 6 months to bring the exposure to or below the action level.
- When there has been a change of equipment, process, control, personnel, or a new task has been initiated that could increase employee lead exposure at or above the action level, Thompson Electric must conduct additional monitoring.
- Thompson Electric will notify each employee, in writing, of employee exposure assessment results within 5 working days after their receipt. Whenever the results indicate that the representative employee exposure, without the use of respirators, is at or above the PEL, Thompson Electric will include a written notice stating the employee's exposure was at or above that level and describe the corrective action taken or to be taken to reduce exposure to below that level.
- Monitoring for the initial determination whether employees are exposed at or above the action level may be limited to a representative sample of those employees exposed to the greatest concentrations of airborne lead. Measurements made within the preceding 12 months, which were performed by the same employer and applicable to the same employee tasks, may be used.
- Where monitoring is required Thompson Electric will collect personal samples representative of a full shift (at least 7 continuous hours) including at least one sample for each job classification in each work area, either for each shift or for the shift with the highest exposure level. Full shift personal samples shall be representative of the monitored employee's regular, daily exposure to lead.
- For those Lead-related tasks/operations that presume lead exposures above the PEL, interim protection must be provided to employees until an employee assessment is completed. Interim protection measures include:
 - Appropriate respiratory protection.
 - Appropriate Personal Protective Equipment (PPE) and clothing.
 - Change areas.
 - Hand washing facilities.
 - Biological monitoring.
 - Training.



Exposure Controls

- Prior to commencement of each applicable job Thompson Electric shall establish and implement a written compliance program to achieve compliance with OSHA 29 CFR 1926.62(c). This Site Specific Lead Compliance Plan shall include at a minimum the following:
 - A description of each activity in which lead is emitted
 - A description of the specific means that will be employed to achieve compliance and, where engineering controls are required engineering plans and studies used to determine methods selected for controlling exposure to lead;
 - A report of the technology considered in meeting the PEL;
 - Air monitoring data which documents the source of lead emissions;
 - A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.;
 - A work practice program which includes items required OSHA and incorporates other relevant work;
 - An administrative control schedule required by OSHA, if applicable;
 - A description of arrangements made among contractors on multi-contractor sites with respect to informing affected employees of potential exposure to lead and with respect to responsibility for compliance with this section as set-forth in 1926.16.
- Where any employee is exposed to lead above the permissible exposure limit for more than 30 days per year, Thompson Electric shall implement engineering and work practice controls (including administrative controls) to reduce and maintain employee exposure to lead in accordance with the implementation schedule in OSHA 29 CFR 1910.1025(e)(1)(ii): Table I, except to the extent that the employer can demonstrate that such controls are not feasible. Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposure to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest feasible level and shall supplement them by the use of respiratory protection which complies with the requirements of OSHA 29 CFR 1910.1025(f) when the use of engineering and work practice controls are insufficient and in emergencies

Engineering Controls	➤ Respiratory protection shall be used during the time period necessary to install or implement any Engineering Controls. ➤ Power tools used for the removal of lead-based paint should be equipped with dust collection shrouds or other attachments exhausted through a HEPA vacuum system. ➤ Cutting/burning, heating, welding should be provided with local exhaust ventilation. ➤ HEPA vacuums should be used during clean-up activities. ➤ Materials containing Lead shall not be applied by spray methods, if exposures are above the PEL, unless employees are protected with certain specified respirators and measures are taken to: ▪ Limit overspray and prevent contamination of adjacent areas. ▪ Establishment of a regulated area that will keep unprotected employees out and prevent the spread of lead dust and fumes beyond the boundaries of the area. - For work inside buildings, this will involve erection of critical barriers over ventilation system vents, doors, open areas, and other possible points of penetration. - Further, it may be necessary to arrange the ventilation system to place the work area under negative pressure relative to the surrounding areas. Management shall specify and enforce the necessary controls.

Administrative or Work Place Controls	➤ Respiratory protection shall be used during the time period necessary to install or implement any Engineering Controls. ➤ Wrecking, demolishing, and salvaging structures where Lead or Lead-containing materials are present; cutting, brazing, grinding, or welding on surfaces that are painted with Lead-containing paints; and transporting, storing and disposing of Lead or Lead-containing materials on the site or location where construction activities are performed. (Exposure of 10 times the PEL for these operations shall be assumed unless data indicates otherwise.) ➤ Performing activities where Lead-containing paints, coatings, or Lead-containing alloys are disturbed by abrasive blasting, welding, cutting, brazing and grinding where the material contains any Lead. (Exposure of 50 times the PEL shall be assumed for these operations unless data indicates otherwise.) ➤ Performing other operations that may result in exposure above the PEL. ➤ When performing these tasks employees shall be provided with suitable respiratory protection (as outlined in Thompson Electric's Respiratory Protection Program), protective clothing, change areas, hand-washing facilities, biological monitoring, and training. ➤ Employee exposure can also be reduced by removing the employee from the hazard (i.e., job rotation). If this administrative control is utilized, Thompson Electric will establish and implement a job rotation schedule. ▪ A current Lead Compliance Program. A Lead Compliance Program is required, but not limited to, the following activities: ▪ Identify the name(s) of each affected employee; ▪ Specify the duration and exposure level at each job or work station where each affected employee is located; and ▪ Include other information useful to assess the reliability of administrative controls to reduce employee lead exposure (i.e., PPE, tools, venting systems).
Subcontract Work	➤ Lead work conducted by subcontractors (other than supplemental labor) requires prior submission of a Lead Compliance Program that incorporates all the elements specified in 29 CFR 1926.62, and all related appendices. ▪ Contractors are also required to perform Lead-disrupting work in accordance with the practices and procedures as outlined in this plan. ▪ The Lead Compliance Program shall be submitted to the Vice President and/or Field Superintendent for approval before beginning any work that disturbs Lead.

Respiratory Protection

- Respiratory protection is required when the concentration of Lead is at or above the PEL after engineering and work practice controls have not been sufficient to reduce exposures.
- Fit testing for respirators must be conducted within 6 months prior to any "Lead" work and at least every 6 months for each employee wearing a negative-pressure respirator while performing lead disturbing work.
- An appropriate respirator, which has been approved by the Mine Safety and Health Administration (MSHA) and/or NIOSH must be selected to protect against lead dust, fumes, and mists.
- If exposure monitoring/experience indicates airborne exposures to contaminants other than lead (i.e., solvents, polyurethane coatings) these exposures must be considered when selecting respirators.
- If requested by the employee, a powered air-purifying respirator must be provided in lieu of a negative pressure respirator for employees assigned specifically to lead disturbing work.

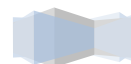


Before respirators are removed, HEPA vacuuming or other suitable method, such as damp wiping, should be used to remove loose particle contamination on the respirator and at the face-mask seal.

➤ Respirators, like all PPE furnished in relationship to this safety policy and procedure, are furnished at no cost to the employee.

Respiratory Protection Guideline for Lead Aerosols as published in “Lead Exposure in Construction; Interim Final Rule.” *Federal Register* 58(84):26630, May 4, 1993).

Airborne Concentration of Lead or Condition of Use	Required Respirator ¹
Not in excess of 500 ug/m ³	Half mask air purifying respirator with high efficiency filters. ^{2,3}
	Half mask supplied air respirator operated in demand (negative pressure) mode.
Not in excess of 1,250 ug/m ³	Loose fitting hood or helmet powered air purifying respirator with high efficiency filters. ³
	Hood or helmet supplied air respirator operated in a continuous-flow mode (i.e., type CE abrasive blasting respirators operated in a continuous flow mode.)
Not in excess of 2,500 ug/m ³	Full facepiece air purifying respirator with high efficiency filters. ³
	Tight fitting powered air purifying respirator with high efficiency filters. ³
	Full facepiece supplied air respirator operated in demand mode.
	Half mask or full facepiece supplied air respirator operated in a continuous-flow mode.
	Full facepiece self-contained breathing apparatus (SCBA) operated in demand mode.
Not in excess of 50,000 ug/m ³	Half mask supplied air respirator operated in pressure demand or other positive-pressure mode.
Not in excess of 100,000 ug/m ³	Full facepiece supplied air respirator operated in pressure demand or other positive-pressure mode (i.e., type CE abrasive blasting respirators operated in a positive-pressure mode.)
Greater than 100,000 ug/m ³ , unknown concentration, or firefighting	Full facepiece SCBA operated in pressure demand or other positive-pressure mode.
¹ Respirators specified for higher concentrations can be used at lower concentrations of lead. ² Full facepiece is required if the lead aerosols cause eye or skin irritation at the use concentrations. ³ A high efficiency particulate filter (HEPA) means a filter that is 99.97 percent efficient against particles of 0.3 micron size or larger.	



Protective Clothing & Equipment

- Protective clothing and equipment is necessary to protect employees from transporting Lead from work to home. If an employee is exposed to lead above the PEL, without regard to the use of respirators or where the possibility of skin or eye irritation exists, the employer shall provide all protective clothing at no cost to the employee and assure that the employee uses appropriate protective work clothing and equipment such as, but not limited to:
 - **Coveralls** or similar full bodywork clothing – Employees may be issued reusable work coveralls in lieu of disposable coveralls. These coveralls shall not be worn home as an alternative to disposable coveralls. Coveralls shall be laundered by Thompson Electric (or the subcontractor for subcontracted work) and provided to employees at least weekly, or daily, if exposure levels exceed 0.05 mg/m^3 , and to employees with skin and eye irritation from Lead. Reusable clothing must comply with the requirements in 29 CFR 1926.62(g)(2).
 - Use work garments of appropriate size, and use duct tape to reinforce their seams (i.e., underarm, crotch, and back).
 - **Gloves** – That meet ANSI Standards.
 - **Hats or Hoods** (e.g. tyvek hoods) – That meet ANSI Standards.
 - **Shoes or Disposable Shoe Coverlets** – That meet ANSI Standards.
 - **Eye Protection** – That meet ANSI Standards:
 - Wear impact resistant eye protection with side shields or goggles.
 - Wear a face shield along with goggles.
- Protective clothing and equipment is required to be removed in an approved and designated change area.
- The contaminated protective clothing that is to be cleaned, laundered, or disposed of is to be placed in a closed labeled container in the change area. Containers shall be labeled with the following warning:

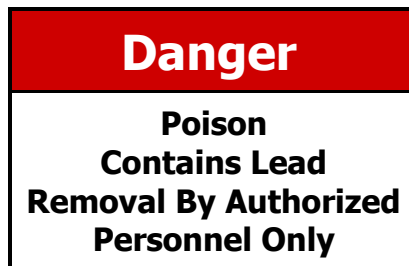
CAUTION: Clothing contaminated with lead. Do not remove dust by blowing or shaking. Dispose of lead-contaminated wash water in accordance with applicable local, state, or federal regulations.

 - At no time may any worker leave the work site wearing lead contaminated clothing or equipment (i.e., shoes, coveralls, respirators, head gear).
 - All contaminated clothing and equipment must be prevented from reaching the workers' home or vehicle. This is an essential step in reducing the movement of lead contamination from the workplace into a worker's home and provides added protection to employees and their families.
- Persons responsible for handling contaminated clothing should be informed of the potential hazard in writing. At no time should lead be removed from protective clothing or equipment by any means that disperses lead into the work area, such as brushing, shaking, or blowing.
- **Heat Stress** – Workers' wearing protective clothing face a risk from heat stress. Additionally, heat stress may be an important concern when working in a hot environment or within containment structures. Heat stress is caused by a number of interacting factors, including: environmental conditions, type of protective clothing worn, the work activity required, and the individual characteristics of the employee.



Housekeeping

- An effective housekeeping program involves at least daily removal of accumulations of lead dust and lead-containing debris. Vacuuming lead dust with HEPA filtered equipment or wetting it with water before sweeping are effective control measures. Such cleaning operations should be conducted, whenever possible, at the end of the work shift/day, after normal operations cease. Furthermore, all persons doing the cleanup should be provided with suitable respiratory protection and personal protective clothing to prevent contact with lead.
- HEPA filters must be emptied in a manner that minimizes Lead dust reentry into the workplace.
- Dry or wet sweeping, shoveling or brushing may be used only if vacuuming or equally effective methods have been tried and do not work.
- Promptly place waste, scrap, debris, bags, containers, equipment, and clothing contaminated with Lead, and consigned for disposal, in sealed impermeable bags (or other closed impermeable containers). Do not allow them to accumulate in the workspace.
 - These bags and containers must be clearly and visibly labeled as follows:



Hygiene Facilities

To minimize exposure to lead, special attention should be given to workers' personal hygiene. Thompson Electric will provide and ensure that workers use washing facilities. Clean change areas, and separate non-contaminated eating areas must also be provided. Employees will be instructed to park cars where they will not be contaminated with lead. These measures are imperative in reducing the employee's period of exposure to lead and the ingestion of lead.

- **Shower Facilities** - When there is potential for extensive contamination of the employee's skin, hair, and protective clothing, shower facilities must be provided so that exposed employees can wash lead from their skin and hair prior to leaving the worksite.
 - Have shower and washing facilities in the area if the airborne levels are greater than the PEL. Showers used for Lead work must be decontaminated before they can be used by other Thompson Electric employees. Portable shower units may be used for required decontamination activities.
 - Where showers are provided, employees must change out of their work clothes and shower before changing into their street clothes and leaving the work site.
 - Shower/Washing facilities shall be in near proximity to the worksite and provided with water, soap, and clean towels to enable employees to remove lead contamination from their skin.
 - Contaminated water from washing facilities and showers must be disposed of in accordance with applicable local, state, or federal regulations.

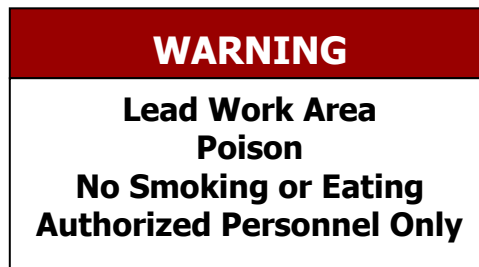


- **Change Areas** - When lead work operations generate airborne lead levels exceeding the PEL, the employer shall provide a clean change area equipped with storage facilities for street clothes and a separate area with facilities for the removal and storage of lead-contaminated PPE. The separation is essential in preventing cross contamination of the employee's clothing.
 - Clean change areas are to be used for taking off street clothes, suiting up in clean working clothes, donning respirators prior to beginning work, and dressing street clothes after work. No lead-contaminated items should enter this area.
 - Work clothing should not be worn away from the job site. Under no circumstances should lead-contaminated work clothes be laundered at home or taken from the worksite, except to be laundered professionally or properly disposed of following applicable federal, state, and local regulations.
- **Hand Washing Facilities.** For all employees who perform Lead-related tasks/operations (regardless of Lead level), hand-washing facilities must be provided. Employees will be instructed to wash their hands and face before eating, drinking, using tobacco products, applying cosmetics or using the toilet.
 - Hand Washing facilities shall be in near proximity to the worksite and provided with water, soap, and clean towels to enable employees to remove lead contamination from their skin.
- **Eye Wash Stations.** Where there is any possibility that employee's eyes may be exposed to lead dust, an eyewash station will be provided within the immediate work area for emergency use.
- Employees are prohibited from smoking, eating, and applying cosmetics in areas where the PEL is exceeded. Additionally no tobacco products, food items, or cosmetics are to be kept in work areas where employees are exposed to Lead above the PEL.
- **Eating Areas** (apart from contaminated areas). Designate separate food storage, preparation areas, and eating areas to avoid the possibility of ingesting Lead. *No Lead work shall be performed in these designated areas.*
 - Eating areas must be as free as practicable from lead contamination and easily accessible to all employees.
 - Employees must wash their face and hands prior to eating, drinking, smoking or applying cosmetics in eating areas.
 - Employees are prohibited from entering these areas when wearing personal protective clothing or equipment unless surface lead dust has been removed by vacuuming, downdraft booth, or other cleaning method.
- **End-of-Day Procedures:** Workers who are exposed to lead should follow these procedures upon finishing work for the day:
 - Place disposable coveralls and shoe covers with the lead waste;
 - Place lead-contaminated clothes, including work shoes, and personal protective equipment for laundering/cleaning (by the employer) in a closed container;
 - Take a shower and wash hair; and
 - Change into street clothes, in designated changing area.



Regulated Areas

- Whenever it can be reasonably anticipated, that Thompson Electric employees, will be exposed to lead in excess of the PEL, Thompson Electric will establish a regulated area alerting employees to the hazard. This regulated area is required to be:
 - Set apart from the rest of the workplace in a way that establishes and alerts employees to the area and its hazards.
 - Is entered only by Authorized Personnel.
 - Is entered only by employees using designated and approved respiratory protection and assigned PPE.
- All employees, upon entering a regulated area, must refrain from eating, drinking, smoking, chewing tobacco or gum, and applying cosmetics. Neither shall employees carry, store, nor use products associated with these activities in these areas.
- Warning signs bearing the following information will be posted at all approaches to regulated areas:



- Signage shall be well illuminated and kept clean, so that they are easily visible to employees and visitors.

Medical Surveillance & Removal Program

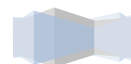
- Thompson Electric shall institute a medical surveillance program for all employees who are or may be exposed at or above the action level for more than 30 days per year.
- Thompson Electric shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician.
- Thompson Electric shall provide the required medical surveillance including, multiple physician review, with no cost to employees and at a reasonable time and place.



Medical Examination Requirements & Conditions

Description	Requirements
Initial Medical Examinations: The initial medical examination provides information from which baseline data can be established for the employee. Thompson Electric shall make available biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels at least every 6 months.	➤ A detailed work and medical history. ➤ A thorough physical examination including an evaluation of the employee's pulmonary status if they will be required to wear a respirator. ➤ Vital signs. ➤ A series of laboratory test to check the employee's blood chemistry and kidney function. ➤ Upon request of the employee, a laboratory evaluation of male fertility or a pregnancy test.
Additional Medical Examinations: Bi-Monthly medical examinations must be made available to employees whose last blood sampling and analysis indicated a blood lead level at or above 40 ug/100 g of whole blood. This frequency shall continue until two consecutive blood samples and analyses indicate a blood lead level below 40 ug/100 g of whole blood;	➤ A detailed work and medical history. ➤ A thorough physical examination including an evaluation of the employee's pulmonary status if they will be required to wear a respirator. ➤ Vital signs. ➤ A series of laboratory test to check the employee's blood chemistry and kidney function. ➤ Upon request of the employee, a laboratory evaluation of male fertility or a pregnancy test.
Medical Examinations Upon Request: If an employee experiences signs or symptoms associated with lead poisoning or has difficulty breathing while wearing a respirator, a medical examination or consultation must be provided as soon as possible. Additionally, employees may request medical advice concerning the effects of current or past exposure to lead on their reproductive abilities.	➤ The content of the types of medical examinations and tests are at the discretion of the examining physician.
Follow-up Medical Examinations: Monthly follow-up medical examinations or consultation must be provided to employees who have been temporarily removed from exposure under the medical removal protection provisions of this safety policy and procedure and the OSHA standard.	➤ The content of the types of medical examinations and tests are at the discretion of the examining physician.
Multiple Physician Review: If an employee is dissatisfied with an examination by the physician selected by Thompson Electric, a second physician can be selected to conduct an independent analysis. The two physicians would attempt to resolve any differences of opinion, and select a third physician to resolve any unresolved dispute.	➤ A detailed work and medical history. ➤ A thorough physical examination including an evaluation of the employee's pulmonary status if they will be required to wear a respirator. ➤ Vital signs. ➤ A series of laboratory test to check the employee's blood chemistry and kidney function. ➤ Upon request of the employee, a laboratory evaluation of male fertility or a pregnancy test.

The use of chelating drugs as a prophylactic measure (i.e., to prevent a detectable rise in blood lead) is an unacceptable medical practice. Chelation may be used by a qualified physician only for diagnostic or therapeutic reasons (that is, to diagnose or treat the signs and symptoms of severe lead toxicity.)



Medical Examination Requirements & Conditions (cont.)

Description	Requirements
Information that is to be provided to the Examining Physician: Physicians must be provided with information from Thompson Electric on employees that are to be medically examined.	➤ This safety policy and procedure and the related OSHA standard with its appendices. ➤ A description of the employee's duties as they relate to occupational lead exposure. ➤ The employee's exposure level or anticipated exposure level. ➤ A description of the personal protective equipment the employee wears (i.e., respirators, tyvek suit). ➤ Prior blood lead level results. ➤ Prior written medical opinions.
Physician's Report: After an examination or consultation, the physician must prepare a written report that contains:	➤ Physician's opinion as to whether or not the employee has any medical condition which places the employee at increased risk of health impairment from exposure to lead. ➤ Special protective measures that are to be provided to the employee. ➤ Blood lead level determinations. ➤ Limitations on the use of respirators. (This determination must also include whether the employee can wear a powered air purifying respirator if unable to wear a negative pressure respirator.)

- **Medical Removal Protection** – MRP is a means of protecting employees when engineering controls, work practices, and respirators have failed to provide the required protection to employees.
 - MRP involves the temporary removal of an employee from the regular job to a place of significantly lower exposure without any loss of earnings, seniority, or other rights and benefits.
 - Temporary medical removal can occur:
 - When an employee's blood lead level (BLL) exceeds 50 ug/dl; and
 - Upon the recommendation of the examining physician.
 - Employees who are removed due to an elevated BLL (BLL exceeds 50 ug/dl at time of removal) must receive a monthly BLL test. If medical opinion caused employee removal, the employee must be provided medical tests or examinations that the physician believes to be appropriate.
 - Employees with elevated blood levels can be removed for up to 18 months providing the job continues.
 - Employees may return to their former job when 2 consecutive blood lead level tests are at 40 ug/dl or below.
 - Employees removed by medical opinion may return only when the physician indicates that it is safe to do so.
 - When the "Medical Removal" is due to the employee's inability to wear a respirator, the removal need only be from jobs with exposure to Lead above the PEL.



Recordkeeping

Three sets of records may be required based upon the severity of the exposure. These include:

- 1) Exposure Monitoring Records;
- 2) Biological Monitoring & Medical Examination Records;
- 3) Medical Removal Protection Records.

➤ **All Exposure Monitoring Records** for airborne lead must be retained. These records must include:

- Monitoring date and shift (i.e., time of sampling).
- Details of the sampling (i.e. duration of the sampling, air volume, etc.) and analytical techniques used and evidence of their accuracy.
- Type of respiratory protective device, if any, worn by the monitored employee and by any other employee whose exposure the monitoring result is intended to represent.
- Results in terms of an 8 hour TWA of each sample taken, and if Lead is not detected, the detection level utilized.
- Explanation of any conditions present that might have affected the monitoring results.
- The name, social security number, and job classification of all employees monitored and of all other employees whose exposures the monitoring result is intended to represent, including where applicable, a description of how it was determined that the employee's monitoring result could be taken to represent other employee's exposures.
- These exposure monitoring records are to be retained for 30 years.

➤ **Medical Surveillance Records** – These records must also be retained. These records shall include, at a minimum:

- Employee's name, social security number, and description of duties.
- A copy of the physician's written opinions and of the explanation sheets for biological monitoring results.
- Results of any physical examination and all test results that are required to be provided by this policy and procedure (i.e., biological tests, X-rays, pulmonary function tests, etc.), or that have been obtained to further evaluate any condition that might be related to lead exposure.
- Any symptomology the employee is experiencing that could be related to exposure to Lead.
- Information provided to the physician at the time of the exam.
- Copy of the result of the examination.
- These medical surveillance records must be retained for the duration of employment plus 30 years in accordance with 29 CFR 1910.20.
- If employee's employment is less than 1 year, these records need not be retained if they are provided to the employee at termination of employment; however, proof of this transfer of records (including a complete inventory of records turned over to the employee) should be retained.
- At the employee's request, Thompson Electric will promptly provide a copy of the employee's medical record, or update as appropriate, to a medical doctor or a union specified by the employee.



- **Medical Removal Protection Records** must also be retained as applicable. These records must include:
 - Name of employee.
 - Employee' social security number.
 - Date of employee removal.
 - Date of employee return.
 - How the removal was accomplished.
 - Whether or not the removal was for an elevated blood lead level.
 - These records are to be retained for the duration of an employee's employment.
- **Training Records** – Thompson Electric will certify that employees have been trained by preparing a certification record for each employee trained. The training records shall be maintained on file for 1 year beyond the date of training and/or retraining.
- **Availability** – Within 15 days following a valid request, Thompson Electric will make an employee's medical records (as required to be kept by this policy and procedure) available for examination and copying to the subject employee, designated representatives, to anyone having the specific written consent of the subject employee, and after the employee's death or incapacitation, to the employee's family members.

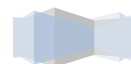


Summary of Control Practices

Control Practice	Exposure Below 30 ug/m ³ (AL)	Exposure Between AL & PEL	Exposure Above 50 ug/m ³ (PEL)
Determination of the Presence of Lead	X	X	X
Competent Person			X
Exposure Monitoring & Associated Recordkeeping	X	X	X
Mechanical Ventilation		X *	X
Local Exhaust Ventilation		X *	X
Enclosures/Containment Systems			X
HEPA Vacuums	X	X	X
Wetting Agents	X	X	X
Written Compliance Program			X
Warning Signs			X
Worker Training		X	X
Notification of Other Employees	X	X	X
Respiratory Protection			X
Protective Clothing/Gloves/Shoe Covers			X
Hand washing Facilities Only	X	X	X
Change Areas w/Storage Facilities			X
Decontamination Facilities Including Showers			X
Eating Areas and Facilities			X
Biological Monitoring and Associated Recordkeeping		X	X
Medical Examinations and Associated Recordkeeping		X	X
Medical Removal Practices	X	X	X

X Indicates that the corresponding control practice is required at that exposure level.

* Could eliminate blood test.



Sample of a Task Specific Lead Compliance Plan

Procedure for the removal of lead-containing paint from the walls of an existing occupied structure:

Lead containing paint will be removed from the walls and ceilings of the Research and Development Lab located in the Plastics Injection Building of Company A. The total area of paint to be removed is 1289 square feet. ➤ 4 employees will trowel paste onto the painted surfaces and cover the paste with a fibrous laminated cloth. ➤ 24 hours after applying the paste, they will use a taping knife to pry up the edge of the cloth and remove the cloth, paste and paint away in one piece. ➤ They will remove as much of the residue as possible with the knife or other acceptable tool. ➤ They will place the cloth, paste, and paint in labeled bags and dispose of them in compliance with local regulations. ➤ After removal of the cloth, paste, and paint, they will clean the surface with an alkaline solution.	
Protective Measures	Employees will wear Tyvek suits with hoods, Tyvek booties, face shields and rubber gloves taped to the sleeves of the Tyvek suits during removal operations.
Technology Considered	Three Technologies were considered: 1. Removal using a hand-held power sander; 2. Use of a contained blast system; and 3. Chemical removal using a paste.
Air Monitoring Data	Since no lead is emitted into the air when paint is removed chemically using a paste, there will be no need to monitor exposures.
Schedule	▪ The paste will be applied to the painted surfaces and covered with a cloth on July 5, 2012. ▪ The paste, paint, and cloth will be removed and disposed of on July 6, 2012. ▪ The walls will be cleaned with an alkaline solution on July 7, 2012.
Work Practice Program	▪ Employees will receive appropriate training and take the protective measures described in Thompson Electric's Lead Compliance Plan. - The Competent Person shall review and list specific measures in the daily Job Hazard Analysis based on the progress of the work scope. ▪ They will perform the same tasks for the same time period. ▪ There will be no task rotation on this work site.
Administrative Control Schedule	Since there will be no rotation of tasks, an administrative control schedule is not applicable to this work site.
Arrangements with Contractors	No part of this project has been contracted out.



Lead Safety Program
Construction Industry 29 CFR 1926.62

Physical Site Location of Training:		Time of Training:	
Instructor Name (please print):		Instructor's Signature:	
		Date of Training:	
Training Roster			
Employee I.D. #	Name (Please Print)	Signature	Job Title
Summary of Training Session (Check all categories presented during training/retraining)			
	Classification of employees (authorized, affected and competent).		
	Health effects & lead hazards.		
	Specific terms & definitions outlined in this plan.		
	Sources of lead exposure.		
	Spill response & emergency procedures.		
	Acceptable work practices to reduce lead exposure including housekeeping.		
	Medical surveillance program & medical removal protection.		
	Employee rights under this policy and the OSHA standard on lead in construction.		
	Personal protective equipment & respirators.		
	Periodic inspection procedures		
	Questions & answers.		
Please list materials passed out, media and video presented, and any pertinent lectures or materials:			





Thompson Electric, Inc.
49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362

Hazardous Energy Control Program

Lockout / Tagout

TEI PROGRAM SAFETY-018 R5 202412

1. Policy

- 1.1. TEI's Hazardous Energy Control Written Program applies to any individual engaged in maintaining, repairing, cleaning, servicing, or adjusting of machinery, or equipment.
- 1.2. TEI will abide by the procedures outlined in this document. These procedures are designed to meet or exceed applicable OSHA standards for safe work practices.
- 1.3. As part of this program a Task Hazard Analysis (THA) will be conducted for all jobs and work scopes. The THA will be used to help ensure safe work practices.
- 1.4. Lockout is a first means of protection; LOTO warning tags (which will be colored Red to distinguish from Tagout Only Tags) only supplement the use of LOTO locks and devices.
- 1.5. TEI approved Tagout Only tags (which will be colored Blue to distinguish from LOTO Tags) may be used only when the application of a lock is not feasible and with approval of the appropriate site supervisor.
- 1.6. TEI shall establish an electrically safe work condition to perform work utilizing the procedures outlined in this document. If the task requires live electric work to be performed, it will be conducted in compliance with the TEI Arc Flash Written Program, NFPA 70E, and any other pertinent regulations.

2. Purpose - Lockout/Tagout ensures that all employees are protected from the unexpected activation of mechanical and/or electrical equipment during maintenance, repairing, cleaning, servicing, or adjusting of machinery, or equipment. It also assures that all employees are protected against the release of residual (stored) energy in equipment and machines.

3. Scope – This process applies to all TEI employees and contractors where such persons perform servicing or maintenance activities on machines or equipment with hazardous energy sources unless specifically excluded below.

- 3.1. Isolation of equipment for purposes other than the personal protection of people to avoid injury (such as operational isolation)
- 3.2. Work on cord and plug connected electrical equipment that energy exposure is controlled by:
 - Being unplugged from the energy source
 - Only one source of hazardous energy, and
 - The plug under immediate control of the person performing the service or maintenance for the entire duration of work.
- 3.3. Diagnostics and testing of electrical equipment as in:
 - Taking readings and/or measurements of electrical equipment with approved testing equipment that can only be performed with the circuit energized
 - Does not require making any physical changes, alterations or repair to the equipment
- 3.4. Normal operation of equipment unless a person must:
 - Remove or bypass a guard or other safety device, or
 - Place any body part into an area on a machine or piece of equipment where:
 - Work is actually performed upon the material being processed (point of operation), or
 - An associated danger zone exists during a machine, equipment or system operating cycle.

4. Definitions

- 4.1. **Authorized Employee:** A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance. An authorized employee has the authority and training to execute the requirements of this SWI.
- 4.2. **Affected Employee:** An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under Lockout or Tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed. Affected employees are not authorized to perform Lockout/Tagout.

- 4.3. **Lockout:** The practice of using keyed locks or combination security devices ("locks") to prevent the unwanted activation of mechanical or electrical equipment.
- 4.4. **Tagout:** The process of using tags in conjunction with locks (when applicable) to increase the visibility and awareness that equipment is not to be energized or active until such devices are removed.
- Tagout devices will be colored blue and attached with cable ties by hand, be self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds.
- 4.5. **ENERGY CONTROL PROCEDURE (ECP) - LOCKOUT-TAGOUT (LOTO) LOG:** A document that details the steps and sequence for preparation shutdown, isolation, energy release, and return to service for each piece of equipment or system, which is undergoing or will undergo Lockout or Tagout.
- (See Appendix A.)
- 4.6. **Activation/Energization:** Energy that sets machinery into motion by starting, switching, pushing, moving, or otherwise engaging power sources for such equipment. Completing a circuit that provides a flow of electricity that is the main or secondary power source for machinery/equipment.
- 4.7. **Energy Isolating Device (EID):** A mechanical device that physically prevents the transmission or release of energy including, but not limited to; Manually operated electrical circuit breaker (not a local switch), disconnect switch or manually operated switch by which the conductors or a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently.
- 4.8. **Hazardous Motion & Energy:** Hazardous motion may result even after power sources are disconnected. Examples are coiled springs, raised hydraulic equipment, and any source energy (i.e., electricity, pressurized steam) that may cause injury. Hazards may be caused by equipment under mechanical stress or gravity that may abruptly release and cause injury.
- 4.9. **Owner:** The authorized employee who controls the Lockout/Tagout process.

5. Responsibilities

5.1. Safety Department & Division Management

- Provide annual training to authorized employees and employees affected by Lockout and Tagout procedures.
- Inspect energy control procedures and practices at least annually to ensure that general and specific Lockout/Tagout procedures are being followed. These inspections should be carried out by persons OTHER than those employees directly utilizing energy control procedures.
- Document that periodic inspections have been performed (*see Recordkeeping & Appendix C, Lockout/Tagout Crew Based Safety Observation Form*).

5.2. Supervisors

- Ensure that each employee and contractor engaging in work requiring locking/tagging out of energy sources understands and adheres to adopted procedures.
- Assure that employees have received training in energy control procedures prior to applying locks or tags to perform servicing or maintenance on machinery or equipment.
- Provide and maintain the necessary equipment and resources, including injury prevention signs, tags, padlocks, and seals.

5.3. Employees

- Adhere to specific procedures as outlined in this document for all tasks that require the use of lockout and Tagout procedures.

6. Specific Procedures

6.1. Preparation for Lockout/Tagout

- Make a survey to locate and identify all isolating devices to be certain which switch(es), valve(s), or other energy isolating devices apply to the equipment to be locked or tagged out. More than one energy source (i.e., electrical, mechanical, hydraulic, thermal, gravity, and chemical) may be present with a single piece of equipment.

6.2. Sequence of Lockout or Tagout System Procedure (Two or fewer employees)

- Notify affected employees that a Lockout and/or Tagout procedure is going to be utilized and the reason.
- The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the hazards thereof.
- If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open toggle switch, etc.).
- Operate the switch, valve, or other energy isolating device(s) so that the equipment is isolated from its energy source(s). Stored energy (such as that in springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as repositioning, blocking, bleeding down, etc.
- For work that will complete in one shift or less, the authorized employee will lockout the energy isolating device(s) utilizing a hasp (if not working alone) along with an Individual Lock and Tag and/or Tagout Tag if not lockable.
- For work that will not complete in one shift or less, the authorized employee will lockout the energy isolating device(s) utilizing a hasp along with a Continuity Lock and Tag. (If the EID(s) are not lockable, a Continuity Tag along with a Tagout Tag shall be affixed to the EID(s).
- Each employee working on the machine or equipment will Lockout/Tagout the energy isolating device(s) with assigned Individual Lock(s) and Individual Tag(s) and/or Tagout Tag(s) if not lockable.
- After ensuring that no personnel are exposed, and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment/machine will not operate.
- CAUTION: Return operating control(s) to neutral or off position after the test.
 - At this point, the ECP LOTO Log shall be populated.
 - Only the owner is required to list their Individual or Continuity Lock and Tag or Tagout Tag for each EID on the LOTO log.
- The equipment is now locked out or tagged out.
- Employees will maintain control of the key(s)/stubs for their Individual Locks/Tagout Tags.
- As each person no longer needs to maintain their Lockout/Tagout protection, that person will remove their Individual Lock and Tag/Tagout Tag protection from the EID(s).

6.3. Sequence of Lockout or Tagout System Procedure (More than two employees)

- Notify affected employees that a Lockout and/or Tagout procedure is going to be utilized and the reason.
- The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the hazards thereof.
- If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open toggle switch, etc.).
- Operate the switch, valve, or other energy isolating device(s) so that the equipment is isolated from its energy source(s). Stored energy (such as that in springs, elevated machine members,

rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as repositioning, blocking, bleeding down, etc.

- The authorized employee will Lockout/Tagout the energy isolating device(s) with assigned lock(s) and Continuity Tag(s) and/or Tagout Tag(s) if not lockable.
- After ensuring that no personnel are exposed, and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment/machine will not operate.
- CAUTION: Return operating control(s) to neutral or off position after the test.
 - At this point, the ECP LOTO Log shall be populated.
 - Only the owner is required to list their Continuity Lock and Tag or Tagout Tag for each EID on the LOTO log.
- The equipment is now locked out or tagged out.
- The authorized employee will place the key(s) to the EID Continuity Locks and or Tagout Stubs in a lockbox and secure the lockbox with a Continuity Lock and Tag.
- The authorized employee will maintain control of the key for the lockbox Continuity Lock and Tag.
- Each person assigned to work on the equipment shall place their Individual Lock and Tag on the lockbox including the authorized employee who controls the Continuity Lock on the lockbox.
- As each person no longer needs to maintain their lockout protection, that person will remove their Individual Lock and Tag from lockbox.

6.4. LOTO Scenario Matrix

- For additional guidance on LOTO scenarios and requirements, (*see Appendix D, LOTO scenario Matrix*).

6.5. Restoring Machines or Equipment to Normal Operations

- After the servicing and/or maintenance is complete and equipment is ready for normal production operations, check the area around the machines or equipment to ensure that no one is exposed.
- After all tools have been removed from the machine or equipment, guards have been reinstalled and employees are in the clear, remove all Individual Locks and Tags and all EID Lockout or Tagout devices.
 - At this point, the ECP LOTO Log Isolation Removed Section shall be completed.
- Operate the energy isolating devices to restore energy to the machine or equipment.

6.6. Temporary Removal of Lockout and Tagout Devices

- In situations where Lockout and Tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment, or component thereof, the following sequence of actions will be followed:
- Remove non-essential items and ensure that machine or equipment components are operationally intact.
- Have employees who applied individual locks and tags remove them.
- Remove required EID Lockout or Tagout devices.
 - At this point, the ECP LOTO Log Temporary Release Isolation Removed section shall be completed.
- Notify affected employees that Lockout and Tagout devices have been removed and ensure that all employees have been safely positioned or removed from the area.
- Energize and proceed with testing or positioning.
 - De-energize all systems and reapply energy control measures in accordance with sections 6.2 or 6.3 of these procedures.
- At this point, the ECP LOTO Log Temporary Release Isolation Restored section shall be completed. (*See Appendix A. Temporary Release section*)

6.7. Maintenance Requiring Undisrupted Energy Supply

- Where maintenance, repairing, cleaning, servicing, adjusting, or setting up operations cannot be accomplished with the prime mover or energy source disconnected, such operations may only be performed under the following conditions:
 - The operating station (i.e., external control panel) where the machine may be activated must always be under the control of a qualified operator.
 - All participants must be in clear view of the operator or in communication with each other.
 - All participants must be beyond the reach of machine elements that may present a hazard.
 - Where machine configuration or size requires that the operator leave the control station to install tools, and where there are machine elements, which may move rapidly, if activated, such elements must be separately locked out.

6.8. Tagout Only

- Only use Tagout Tags where the EID is not suitable for locking devices.
- Application of locks on EIDs is not discretionary; if the EID is capable of accepting a lock, the Authorized Employee applies a lock.
- Additional means of isolation are required when applying Tagout rules, such as:
 - Removing an isolating element
 - Disconnecting power feeds
 - Opening the isolation device to remove from the system
 - Closure of another in-line valve
 - Removal of a valve handle
 - Opening and racking out a circuit breaker, or
 - Locking, blocking, or barricading a controlling switch

6.9. Shift Changes/Long Term Shutdowns

- During shift changes or long-term shutdowns, the continuity of lockout or Tagout will be ensured by following the below procedures:
 - The oncoming Authorized Employee shall add their individual lock and tag on the lockbox so the departing Authorized Employee can remove his/her individual lock and tag.
 - The key to the Continuity lock and tag on the lockbox will be transferred from the outgoing Authorized Employee to the oncoming Authorized Employee
 - The oncoming Authorized Employee shall verify the Energy Isolating Devices (EID's) with the outgoing Authorized Employee. This cannot be performed independently (i.e., both Authorized Employees need, "To Walk it Down").
 - For complex situations, consult the Safety Department for guidance.

7. Absent Person LOTO Device Removal Form

- Removal of LOTO in extenuating circumstances requires the approval of a Division Manager/Project Manager and at least one Safety Representative working in unison.
 - (See Appendix B, Absent Person LOTO Device Removal Form).

8. Customer Requirements

8.1. Prior to commencing work, consult with a customer representative and TEI Safety Department regarding additional energy sources that could affect your work scope that may need Lockout/Tagout devices installed.

9. Employee Training

9.1. Employees who may be exposed to hazardous energy will receive training before assignment to ensure that they understand TEI's energy-control policy and have skills to apply, use, and remove energy controls. The training will include the requirements of 1910.147 and the following:

- Affected employees will be trained in the purpose and use of energy-control procedures.
- Authorized employees will be trained to recognize hazardous energy sources, the type and magnitude of energy in the workplace, the methods and means necessary for isolating and controlling energy, and the means to verify that the energy is controlled.
- Employees whose jobs are in areas where energy-control procedures are used will be trained about the procedures and the prohibition against starting machines that are locked or tagged out.
- Employees will be retrained annually to ensure they understand energy-control policy and procedures.
- Authorized and affected employees will be retrained whenever their job assignments change, energy-control procedures change, equipment or work processes present new hazards, or when they don't follow energy-control procedures.

10. Recordkeeping

10.1. Inspection Records

- Safety Department will maintain all completed Lockout/Tagout Crew Based Safety Observation Forms for one year.

10.2. Training Records

- Current training records will be maintained for each authorized and affected employee including the employee's name, training date, trainers name, training syllabus, and test results when applicable.
- Training records will be maintained by the Safety Department.

10.3. Energy Control Procedure Lockout/Tagout (LOTO) Log (*Appendix A*)

- Completed forms are to be returned to the Safety Department
- ECP logs will be retained for 6 months from completion date

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Origination	Safety Div.	Vice President		08/01/12
1	Replaced Safety Manager w/Safety Director	Safety Div.	Vice President	12/28/12	01/31/13
N/A	No Changes, Revisions, Additions	Safety Div.	Vice President	05/15/13	01/31/14
2	Removed Vice President of Operations	Safety Div.	Safety Director	05/15/15	05/15/15
3	Affected employee notification, stored energy release, Host Employer compliance	Safety Div.	Safety Director	07/08/19	07/08/19
4	- Clarified role of Vice President of Operations - Retraining – Changed from “may be required” to “will be required” to maintain Authorized Employee Status - Retraining – Clarified that re-training (i.e., additional training) will be required to Customer Specific Guidelines - Working On or Near Energized Circuits – clarified that an individual’s CPR training must be current - Emergency Removal of a LOTO Device – Updated and created form that must be completed/submitted prior to removal; New THA or JHA must be completed and submitted with form - Removal of LOTO Exception Program Log - Clarified Project Managers, as well as Division Managers	Safety Div.	Safety Director	08/2020	09/2020
5	Previous revisions replaced with document formerly named SWI #014.	Safety Dept.	VP of Ops	12/2024	12/2024



Energy Control Procedure Lockout/Tagout Log

Isolation Scope & Document Retention - (✓) one



Non-Confined Space



Confined Space

Site Foreman/General Foreman:

Equipment:			
Location:			
Lock Box Number:		Lockbox Location:	Reviewed Date: _____
Procedure Prepared by (list all involved):			Reviewed Signature: _____
² Verification Methods (methods include the following):	1. Voltage Detector Testing 2. Visually Verify Wires Disconnected 3. Visually Verify Fuses Pulled 4. Visually Verify Blades Fully Open 5. Attempt to Restart or Operate Equipment 6. Capacitors – Energy released/grounded 7. Stored Energy – Released/Blocked 8. Other:		
Verify Isolation:	<i>(Shall be completed by person that did not populate ECP unless working alone)</i> <i>I have performed all required verification methods and confirm there is no stored energy to verify that the isolation that has just been completed is effective.</i>		 (Initials)
Comments:	_____		

LOTO LOG:	Procedure Preparer(s) – Complete all sections of procedure that are shaded	Field Executor(s) – Update remainder of energy control procedure as elements are executed
¹ Isolating Device Types: LO = Lock/Tag TO = Tagout Tag		² Refer to Verification Methods Listed Above

Isolating Device				Description/Location	Normal Position	Isolated Position	Isolation Installed		Method(s) for Verification ²	Isolation Removed		Temporary Release
Lock (✓)	Ind. Tag (✓)	Tag #	Type ¹	Equipment ID, hazardous energy type, voltage, valve size, etc.	Position of the EID normally	On/Off, Open/Closed	Installer Initials	Date	List all methods required to verify that hazardous energy is not present ²	Remover Initials	Date	Number
				1.								
				2.								
				3.								
				4.								
				5.								
				6.								



Energy Control Procedure Lockout/Tagout Log

Isolation Scope & Document Retention - (✓) one



Non-Confined Space



Confined Space

Site Foreman/General Foreman:

LOTO LOG:

Procedure Preparer(s) – Complete all sections of procedure that are shaded*Field Executor(s)* – Update remainder of energy control procedure as elements are executed¹ Isolating Device Types: LO = Lock/Tag TO = Tagout Tag² Refer to Verification Methods Listed Above

		Isolating Device or Bond		Description/Location	Normal Position	Isolated Position	Isolation Installed		Method(s) for Verification ²	Isolation Removed		Temporary Release
Lock (✓)	Ind. Tag (✓)	Tag #	Type ¹	Equipment ID, hazardous energy type, voltage, valve size, etc.	Position of the EID normally	On/Off, Open/Closed	Installer Initials	Date	List all methods required to verify that hazardous energy is not present ²	Remover Initials	Date	Number
				7.								
				8.								
				9.								
				10.								
				11.								
				12.								

Temporary Release

Temporary Release Description		Isolation Removed			Isolation Restored			Restoration Verified
#	Reason	Initials	Date	Time	Initials	Date	Time	Initials Authorized Person
01								
02								
03								
04								
05								
06								
07								

Appendix B



Lockout and Tagout Crew Based Safety
Observation Report

Inspection Date:	Inspector:	Employee(s)			
Subcontractor (When Applicable):		Subcontractor Employee(s):			
Machine/Equipment on which the energy control procedure was being utilized:					
Does employee have access to adequate Lockout/Tagout devices?		☐	Yes	☐	No
Has employee tested the effectiveness of his/her Lockout/Tagout devices?		☐	Yes	☐	No
Has employee received Lockout and Tagout training in the last year?		☐	Yes	☐	No
If this is a TEI subcontractor, has a supervisor informed him/her of the necessity for adhering to these Lockout/Tagout procedures?		☐	Yes	☐	No
Have all procedures been followed?		☐	Yes	☐	No
Are Lockout/Tagout Tags legible and clearly displayed?		☐	Yes	☐	No
Comments/Observations:					

Appendix C

	Absent Person LOTO Device Removal Form		Date of Request	
			Division	
Two designated Supervisors/Managers must fully evaluate the equipment and concur that no employee will be injured upon removal of the LOTO device and energization of the equipment. Two functional levels of supervision are preferred (i.e., Customer Maintenance Supervisor or Authorized Representative; Highest Ranking TEI Site Supervisor; TEI Project Manager; TEI Division Manager). If you need help, contact the Safety Department.				
Equipment Name:		Equipment Location:		
Equipment ID:		Isolation(s):		
If applicable Customer LOTO Permit or Procedure Number(s):		If applicable Name of Customer Rep who issued LOTO Permit:		
Reason it was placed under a LOTO Device (locked out/isolated from energy source):				
Name of LOTO Device Owner:		LOTO Device ID Number:		
Requestor:	Signature:	Date Removed:	Time Removed:	
Reason the LOTO Device owner cannot remove the device (include an explanation as to why it must be "cut off"):				
All steps to be taken to assure that the employee is not on site (check ✓ each box):				
	Verify if employee's direct supervisor or manager is on site. If available, that supervisor/manager is to be involved in this process.			
	Go to the area and look for the employee. Ask other employees in the area if the LOTO device owner is still on site.			
	Page or call the employee.			
	If applicable, check company issued GPS devices to see if his/her company vehicle is at the location. Or check with plant security to see if employee checked out of the work site.			
	Verify that all employees are in the clear and that there is no safety or other reason that the equipment must remain locked.			
	Verify that all tools, parts, debris, employees are in the clear.			
	Verify that all guards are in place.			
Approval Granted by:				
1 st Level of Customer's or TEI Supervision's Information (see above guidelines)				
Manger/Supervisor:		Signature:		Date Approved:
2 nd Level of Supervision's Information (see above guidelines)				
Manger/Supervisor:		Signature		Date Approved:
This incident must be reviewed by the Division Manager/Project Manager and Safety Representative, with the LOTO device owner, prior to their starting any work on the next scheduled workday. Completed form and relevant devices are to be returned to the Safety Department for processing.				

Appendix D

LOTO Scenario Matrix

11. X –

Required O -

Optional

Scenario	Energy Isolating Device(s) EID(s) Lockable		EID(s) not Lockable	Hasp	Lockbox	ECP LOTO Log
	Continuity Lock/Tag	Individual Lock/Tag	Tagout Tag			
Two or Fewer Employees One Shift or Less		X On EID(s)	X ON EID(s) See Note 2	O See Note 5	O See Note 7	X
Two or Fewer Employees Greater Than One Shift	X On EID(s)	X On EID(s)	X On EID(s) See Notes 2, 3	O See Note 5	O See Note 7	X
More Than Two Employees	X On EID(s)	X See Note 1	X On EID(s) See Note 3, 4	O See Note 6	X See Note 8	X

Notes:

1. Each employee working on the machine or equipment places their individual lock/tag on the lockbox
2. Employee(s) maintain control of Key Stub
3. A Continuity tag(s) must be placed along with a Tagout Tag(s) when work will not complete in one shift or less
4. Key Stub(s) placed in Lockbox
5. Utilize Hasp as needed
6. Utilize Hasp on Lockbox as needed
7. When utilizing a Lockbox for two or fewer employees, follow the matrix for more than two employees
8. A Continuity Lock/Tag shall be placed on the Lockbox and the key controlled by the Authorized (Owner) employee who executed the LOTO procedure



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362

MEWP

Mobile Elevated Work Platform

TEI PROGRAM SAFETY-019 R5 20241108

Introduction

The purpose of this program is to establish safety guidelines for Thompson Electric, Inc. (*herein referred to as TEI*) employees who operate, perform work on, or work near mobile elevated work platforms (*herein referred to as MEWPs*).

TEI is committed to providing a safe work environment for all employees. Workers involved with, or working around, MEWPs will be trained on the hazards of such work and the requirements of this program.

MEWP's shall be designed, constructed, and maintained, in conformance with the applicable requirements of the American National Standards (ANSI) for Mobile Vehicle Mounted Elevating and Rotating Work Platforms.

Policy

It is the policy of TEI to permit only trained and authorized personnel to operate MEWPs. This policy is applicable to both daily operators and those who occasionally use a MEWP. TEI employees, and Sub- Contractor employees will not use the host employer's Mobile Elevating Work Platforms.

These written MEWP operation procedures establish guidelines to be followed, whenever any employee works with MEWPs at TEI.

Excluded from the scope of this policy:

- Insulated buckets for electrical work (reference 29 CFR 1910.269 "Electric Power Generation, Transmission, and Distribution")

Objectives

The objectives of this MEWP program include, but are not limited to:

- To ensure that operators understand the proper selection, limitations, and safe operations of the equipment.
- To ensure that all equipment is properly maintained and is kept in good working order.
- To ensure that equipment malfunctions are noted before accidents occur.
- To ensure that non-qualified employees do not use this equipment.
- To ensure that operators receive refresher training as necessary.
- To ensure that qualified trainers are available to certify new operators and conduct refresher training as necessary, and required.
- To ensure Minimum Clearance Distances (MAD) for Live Wire Electricity (See table on next page) are maintained at all times.
- To ensure a customer's requirements, in addition to those outlined in this policy, for the use of MEWPs on their job sites are adhered to and enforced at all times.
 - This shall be addressed on the THA prior to any use
- To ensure a fall protection/rescue work plan has been established, documented, and reviewed by all affected employees for each MEWP to be used by any TEI employee or subcontractor employee.

Definitions

Competent Person – One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Delivery – Transfer of care, control, and custody of the MEWP from one person or entity to another person or entity.

Directional Controls – Controls that initiate functions that affect movement of the platform or the MEWP.

Guardrail System – A vertical barrier erected to prevent personnel from falling to lower levels.

Instability – A condition of an MEWP in which the sum of the moments that tend to overturn the unit exceeds the sum of the moments tending to resist overturning.

Interlock – A control or mechanism that, under specified conditions, automatically allows or prevents the operation of another control or mechanism.

Manufacturer – An entity that makes, builds, or produces a MEWP.

MEWP (Mobile Elevated Work Platform) – A mobile device that has an adjustable work platform that can be elevated in order to perform work above the ground level. Examples of MEWPs include scissors lifts, aerial boom lifts, articulating boom lifts, etc.

Modification – To make a change(s) to a MEWP that affects the operation, stability, safety factors, rated load or safety of the MEWP.

Operator – A Qualified Person who controls the movement of the MEWP.

Outriggers – Devices that increase the stability of the MEWP and that are capable of lifting and leveling the MEWP.

Override – To take over MEWP movement control functions of the upper control station by the lower control station.

Owner – A person or entity that has possession of a MEWP by virtue of proof of purchase.

Platform – The portion of a MEWP intended to be occupied by personnel with their necessary tools and materials.

Qualified Person – A person, who by reason of knowledge, experience, or training is familiar with the operation to be performed and the hazards involved.

Shall – the word “Shall” is to be understood as being mandatory.

Stabilizers – Devices that increase the stability of the MEWP but are not capable of lifting or leveling the MEWP.

Unrestricted Platform Capacity – The weight capacity of the machine’s platform for the machine’s entire working envelope.

User – A person(s) or entity that has care, control and custody of the MEWP. This person or entity may also be a dealer, owner, lessor, lessee, or operator.

Program Administration & Enforcement

The Vice President of Operations will approve the annual review, updating, and implementation of any revisions of the written MEWP program annually and whenever necessary to include new or modified tasks, procedures and equipment.

In keeping with this responsibility, the Vice President of Operations has designated the following classifications of TEI employees as being responsible for the specific tasks as outlined below.

Division Management is responsible for

- The implementation of the MEWP policy, and program, on their job sites and with all their assigned employees.
- Ensuring that all provisions of TEI's MEWP Written Program and customer requirements are followed by their assigned employees and subcontractor employees.
- Ensure retention of verification of the employee's MEWP training documentation in her/his safety file, and that only employees whose training is current, and in good standing, operate any MEWP while in the employ of TEI.
 - This includes any subcontractor employees working on their job sites.
- Work with TEI Safety to review updates to the written MEWP program at least annually and whenever necessary to ensure compliance with new or modified tasks and procedures.
- Conducting/documenting periodic crew-based safety observations of their MEWP operators on their job sites to ensure compliance with all aspects of this program.

Project Managers are responsible for:

- The implementation and execution of this program and any additional customer requirements since each job site has direct control over the application and operation of MEWP.
- When renting a lift, requiring that the rental agency provide a copy of the annual inspection prior to delivering the lift to the work site. This annual inspection must be on-file with TEI Fleet.
 - In addition, and to comply with revised ANSI A92 standards, a decal (or other means) must be provided on the MEWP to mark the date of the last annual inspection and the date of the next future inspection.

Supervisory Personnel are responsible for ensuring:

- Employees only operate MEWPs for which they have current training.
- Employees are competent to operate a MEWP through onsite observations.
- Employees operate work platforms safely.
- Prohibiting employees, and sub-contractor employees, from using any equipment not meeting the requirements of this program.
- Ensure that the operating and maintenance manuals have been received, made available to each operator, placed in a weather-proof compartment on the lift.
- When safety-related concerns have been discovered through pre-use inspections, or at any other time, ensuring that the lift is immediately locked out of service until Fleet management has been notified and the item(s) has been repaired.
- Ensuring pre-task planning (THA and Fall Protection/Rescue Work Plan) has been undertaken, documented and is in place for each MEWP being operated on their work site.

- Decisions on the use and operation of the Elevating Work Platforms must always be made with due consideration that the machine will be carrying personnel whose safety is dependent on those decisions.

All Employees are responsible for:

- Inspecting and performing safety checks on the work platform before each use;
- Immediately report any deficiencies (no matter how minor) found during pre-use inspections to their immediate supervisor after red tagging the equipment and taking it out of service;
- Operating work platforms safely to prevent injury or damage; and
- Not operating a work platform for which they have not been trained.

All Contractors and Sub-Contractors are responsible for:

- Complying, at a minimum, with the procedures and work practices outlined in Thompson Electric's MEWP.

Fleet Management will:

- Maintain maintenance records for owned and rented lifts to ensure that appropriate maintenance and inspections are scheduled in a timely manner and implemented on the lifts.
- Ensuring any modifications are only performed if approved by the manufacturer or their successor, or, if they are no longer in business, an engineer with expertise in MEWPs. Additionally, only the MEWP owner can authorize a modification to a MEWP.

Safety Department is responsible for:

- Conducting MEWP classroom training and practical evaluations during onboarding or prior to initial assignment to ensure employees are competent to operate a MEWP.
 - Unless conducted by a Safety Department approved 3rd party
- Making unannounced field safety observations to verify safe operation of MEWPs
- Review and update as needed the MEWP Written Program and associated training materials, at a minimum, annually.
- Maintain training records within TEI's current data base.

Employee Training & Testing

- Training shall be conducted by a qualified person with expertise in operator responsibilities, boom safety (if applicable, weight capacity, machine stability, pre-start inspection and general safety procedures).
- Training shall consist of the following components:
 - Basic principles and safe work procedures for MEWPs.
 - MEWP classifications, their uses and limitations (see Appendix A).
 - Pre-work or pre-task operator inspection procedures for specific MEWP(s).
 - Safe work procedures for utilization of MEWPs by authorized personnel.
 - Safe operations procedures regarding MEWP operations in proximity to other personnel, pedestrians, electrical sources, obstructions and other situations that have the potential to present hazards or cause complications to the task or scope of work.
 - MEWP and other related safety procedures that pertain to specific host employer requirements at the host employer's work sites and facilities.
 - Load limits for individual elevating work platforms and that these shall not be exceeded.
 - Recognizing hazards that specifically relate to MEWP operations. Since Thompson's fleet includes more than one type (i.e., manufacturer) of elevating work platforms, plus rental units, the operator must also read and understand the manufacturer's operating and maintenance manual for the specific elevating work platforms they are expected to operate prior to operating the equipment

- Personnel so trained will be tested through a written exam along with a hands-on evaluation performed by a competent person as a way to help confirm and document their understanding of the information presented.
 - A score of between 80% and 100% will require a review of missed questions, if any, and the score corrected to 100%.
 - A score of below 80% will require complete retraining and retesting.
- Proficiency in hands-on operation of the platform.
- Personnel are not to ride on an aerial platform lift if they have not been trained and successfully completed the classroom portion of Thompson's MEWP safety training.
 - They may ride on that lift with an approved operator (assuming the lift is approved to carry more than one person) but the trainee may not operate that lift until they have successfully completed all training requirements (i.e., hands-on evaluation).

Pre-Job Work Site Inspection

The MEWP operator shall conduct a pre-job worksite inspection to identify hazards and determine if a ground watch is necessary.

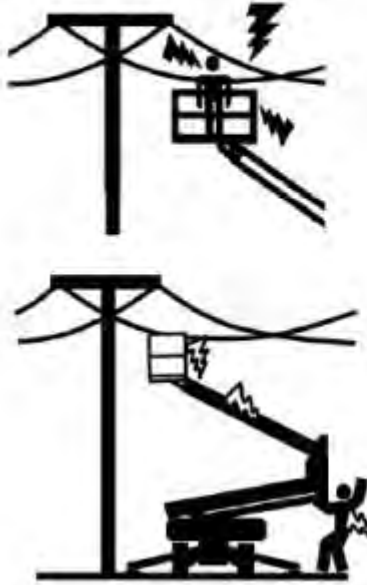
- The operator shall check the travel path for hazards including:
 - Drop-offs and holes
 - Bumps
 - Debris
 - Overhead obstructions and high voltage conductors
 - Hazardous locations requiring a hot work (vehicle entry) permit
 - Inadequate surface stability
 - Travel grade
 - Coverings which may conceal holes and other hazards
 - Wind and weather conditions
 - Presence of unauthorized persons

Electrical Hazards

- Use of MEWPs as described in this policy and its related procedures does NOT provide protection from contact with or proximity to an electrically charged conductor.
- A minimum distance of 10 feet clearance must be maintained from all aerial energized electrical lines and apparatus. Always allow for boom sway if applicable.
- In the event closer operation is required, Safety and Division Management shall be contacted for guidance. No operation may take place under these circumstances until Safety and Division Management has reviewed the circumstances and put administrative and engineering controls in place.

Electrocution Hazards

- This machine is not insulated and does not provide protection from contact or proximity to electrical current.



- Maintain safe distance from electrical lines, apparatus, or any energized (exposed or insulated) parts according to the Minimum Approach Distance (MAD) as shown in Table 1-1.
- Allow for machine movement and electrical line swaying.

Table 1-1. Minimum Approach Distances (M.A.D.)

Voltage Range (Phase to Phase)	MINIMUM APPROACH DISTANCE in Feet (Meters)
0 to 50 KV	10 (3)
Over 50KV to 200 KV	15 (5)
Over 200 KV to 350 KV	20 (6)
Over 350 KV to 500 KV	25 (8)
Over 500 KV to 750 KV	35 (11)
Over 750 KV to 1000 KV	45 (14)
NOTE: This requirement shall apply except where employer, local or governmental regulations are more stringent.	

- Maintain a clearance of at least 10 ft. (3m) between any part of the machine and its occupants, their tools, and their equipment from any electrical line or apparatus carrying up to 50,000 volts. One foot additional clearance is required for every additional 30,000 volts or less.

Operational Requirements

- Operating and maintenance manuals shall be available for each MEWP located on TEI property or work sites. The operating manual shall be provided with each rental, lease or sale delivery and shall be stored in a weather resistant storage compartment located on the MEWP.
- Before the MEWP is used and during use, the operator shall check the area in which the MEWP is to be used, ensuring hazards are documented on the daily THA. The workplace assessment shall include but is not limited to the following:
 - Floor/travel surfaces for drop offs, holes, uneven surfaces, sloped floors;
 - Housekeeping debris, obstructions, cords, construction materials and supplies;
 - Hazardous Energy. Electrical power cables, panels or chemical lines, gas lines, drain lines, and utilities.
 - Under/Overhead obstructions. Tight working conditions, adjacent structures, pipe racks, ceiling grids and any other possible material or equipment that can be lodged or come in contact with the MEWP.
- **Guardrails** shall comply with 29 CFR 1926.451(g) for all Type A MEWP's.
 - Gates (chains or manufactured gates) shall be closed and secured while the MEWP basket is occupied.
- **Load Capacity** – The load and its distribution on the MEWP and any platform extension shall be in accordance with the manufacturer's rated capacity for that specific configuration.
 - Rated capacities shall not be exceeded when loads are transferred to the MEWP at any height.
 - MEWPs shall not be used as a crane, (i.e., transport of materials, hoisting tools and equipment, etc.)

- **Clearance** – There shall be adequate clearance from overhead obstructions to prevent personnel from becoming caught between the MEWPs and the surrounding facility structures.
 - Personnel shall remain within the confines of the guardrails during all vertical movement of the work platform (i.e., personnel shall not lean out over the handrail during vertical movement).
- **Preventing Inadvertent/Accidental Movement** – MEWP control panels/stations shall include a separate control which shall be continuously activated by the operator for upper directional controls to be operated, which can be released by the operator independently from the directional controls, and which renders upper controls inoperative when released i.e., two-hand controls.
 - (*Excerpt from ANSI A92.6 1999*) – Controls which activate movement of the MEWP must return to the “Off” or “Neutral” position when released. Time-delay activation controls are not permitted. Note: For lifts that utilize a “trigger-type” enable function on the joystick, the trigger must be activated prior to joystick movement for the lift to operate.
- **Elevated Driving Requirements** – Visual and verbal communications prior to lift movements should be utilized to warn pedestrian and co-workers that the lift will be set in motion. Work platforms shall be lowered to their base position prior to traveling horizontally to different work locations (over 10 feet).
 - Horizontal movement of the work platform in the elevated position is only allowed for the final positioning of the lift at the specific work location.
 - All movements performed in congested work locations must be performed with the aid of a Qualified Spotter (see “Spotter” section of this policy).
- **Travel Speeds** – Under all travel conditions, the operator shall limit travel speed according to conditions of ground surface, congestion, visibility, slope, location of personnel, and other factors causing hazards of collision or injury to personnel.
- **Personnel Footing** – Personnel shall maintain a firm footing on the platform floor while working. The floor of the work platform shall be kept in a clean and orderly fashion (i.e., free of trash, materials, tools, etc.) Use of planks, ladders, basket guard rails or any other device on the MEWP for achieving additional height or reach is prohibited.
- **Fall Protection** - An ANSI approved fall restraint/arrest system shall be worn and attached to a designated attachment point when working or traveling in any MEWP.
 - This policy requires employees to use the anchorage points provided for by the manufacturer for each lift (i.e., boom, basket). Refer to the Operator’s Manual for each piece of equipment if guidance is needed.
 - Tying the personal fall arrest system off to an adjacent pole, structure, or equipment while working from an MEWP shall not be permitted.
 - When it is necessary to transfer from the platform to another structure or vice versa, use a two-legged lanyard to maintain 100% fall protection
- **Work Area** – The operator and/or the spotter shall ensure that the area surrounding the MEWP is clear of personnel and equipment before lowering the platform. Care shall be taken to prevent ropes, electric cords and hoses from becoming entangled in the MEWP.
- **Altering Safety Devices** – Altering or disabling interlocks or other safety devices is prohibited and will result in termination.
- **Fueling** – The engine shall be shut down while fuel tanks are being filled. Fueling shall be done in a well-ventilated area free of flame, sparks, or other hazards that may cause fire or explosion.
- **Battery Charging** – Batteries shall be charged in a well-ventilated area free of flames, sparks, or other hazards that may cause fire or explosion.
- **Improper Platform Stabilization** – The MEWP shall not be positioned against another object to steady the

work platform.

- **Stabilizers** – The outriggers, stabilizers, extendible axles, or other stability enhancing means shall be used as required by the manufacturer.
- **Driving on Slopes** – The MEWP shall not be driven on grades, side slopes or ramps exceeding those for which the MEWP platform is rated by the manufacturer.
- **Snagged Platform** – If the MEWP basket or supporting assembly becomes caught, snagged, or otherwise prevented from normal motion by adjacent structures or other obstacles such that control reversal does not free the platform, all personnel shall be removed from the platform/basket before attempts are made to free the platform using chassis controls.

Spotters

- Spotters shall be required when there is a potential for operator injury due to physical contact with structures or facility systems.
- Spotters shall be required when there is a potential for damage to structures or sensitive facility (i.e., customers) systems.
 - Congested work locations such as overhead piping/mechanical chases above ceiling grids, in close proximity to other personnel, in operating manufacturing areas, areas of poor visibility, in locations adjacent to Hazardous Production Material, in areas with floor openings/leading edges, or in areas containing energized electrical equipment.
- A safety spotter may be another co-worker located on the work platform or on the ground depending on area to be observed during movement.
- The spotter shall work in conjunction with the operator to ensure the MEWP is utilized in a safe manner.
- Spotters shall be trained on how to perform their assigned roles/responsibilities as defined in this policy. This shall include, but not be limited to;
 - To understand the basic operating procedures of each MEWP they monitor.
 - Each spotter shall be trained in the operation of the MEWP's lower controls
 - Possess complete understanding of the overriding capability of the upper controls.
- Spotters are not permitted to perform any other duties while being the designated "spotter".
- Spotters shall be in a visual line of sight with the MEWP and be able to lower the MEWP in an emergency. EMO button shall be visible and unobstructed.
- Spotters are not Qualified Observers.
- The spotter shall work with the operator of the MEWP in conducting a hazard assessment for potentially hazardous operating conditions prior to all horizontal or vertical movements of the MEWP.

Hazard Warning/Signage/Barricading

When other moving equipment and/or personnel are present in the work area, special precautions shall be taken to prevent injury to people and/or damage to structures or equipment.

- Warnings such as, but not limited to, flags, roped-off areas, flashing lights, safety cones or barricades shall be used. Additional warning/signage may be required per customer's operating rules.

Reporting Problems or Malfunctions

- Operators shall immediately report any problems or malfunctions that become evident during the pre-use inspection or during operation to their foreman/supervisor.
- Any lifts with problems or malfunctions that affect the safety of operations shall be immediately removed

from service, locked/tagged out of service and the TEI Fleet Manager contacted for repair prior to any continued use.

Inspection Requirements

- MEWP inspections shall be scheduled and maintained as required by the manufacturer to ensure proper operation.
- The frequency of inspections and maintenance shall be determined by the manufacturer's recommendations and be compatible with operating conditions and the severity of the operating environment.
- MEWPs that are not in proper operating condition shall be immediately removed from service until repaired.
- Repairs shall be made by a qualified person and the repairs shall be in conformance with the manufacturer's recommendations.
- Each TEI work site shall implement a MEWP inspection program that at a minimum includes the following inspections:
 - Lift Approval Inspection: Upon arrival on a TEI site all MEWPs shall be inspected utilizing the manufacturer's or TEI's pre-use inspection form to ensure they comply with the requirements set forth in this policy.
 - A decal or other means must be provided on the MEWP to mark the date of the last annual inspection and the date of the next future inspection, and a copy of the annual inspection must be on file with TEI Fleet Manager.
 - A copy of the operator's manual must be on the lift and shall include a listing of MEWP functions, features, operating characteristics, limitations, devices, operating and inspection guidelines.
 - Daily Pre-Use Inspection: Before use each day or at the beginning of each shift, the MEWP shall be given a visual inspection and functional test through the use of the daily MEWP inspection form. The daily pre-use inspection form shall be maintained, and readily available on the work site, at all times during its use.
 - Maintenance Inspection: MEWP's that have been in service for 3 months or 150 hours (whichever comes first), or have been out of service for a period longer than 3 months, shall be inspected by a person qualified as a mechanic on the specific make and model of the MEWP.

Maintenance Requirements

- **General Maintenance** – MEWPs shall be maintained in accordance with the manufacturers' specifications. Preventive maintenance programs shall be in place to ensure safe operation of MEWPs at all times. All malfunctions and problems identified shall be corrected before the MEWP is returned to service.
 - Only trained personnel shall repair and/or perform adjustments to the MEWP.
- **Modification** – Modification or alteration of a MEWP shall be made only with prior written permission of the manufacturer through TEI's Fleet Manager.
- **Replacement Parts** – When parts or components are replaced, they shall be identical or equivalent to the original MEWP parts or components.
- **Pre-Delivery Preparation** – TEI owned MEWPs shall be inspected, serviced, and adjusted to the manufacturer's requirements prior to delivery onto a TEI work site.
- **Special Incident Inspection** - An annual inspection shall be conducted before continuing the operation of an MEWP following any incident where the MEWP has obvious or suspected operational damage. This special incident inspection (annual) must be supported by communications to the manufacturer of the MEWP requesting any additional specific inspection or maintenance checks that should be done.

Records Retention

- Maintenance, inspection and training records shall be maintained for equipment and its operators.
- Training records shall be maintained by Human Resources and Safety for a period of ten years.
- The following records shall be maintained for all Thompson Electric owned and rented MEWPs:
 - Pre-start inspection documents shall be maintained for a period of one year after completion.
 - Annual inspection documentation shall be maintained for the entire ownership of the lift.
 - All maintenance performed on the lift shall be maintained for the entire ownership of the lift.

This appendix covers the updated classification of MEWPs as defined in ANSI's 2018 update. Per the ANSI update, aerial lifts are now referred to as Mobile Elevated Work Platforms (MEWPs). MEWPs have been divided into 2 groups:

- **Group A:** The center of the work platform remains within the perimeter of the chassis
 - Scissor Lifts and Vertical Lifts
- **Group B:** The center of the work platform can be positioned beyond the perimeter of the chassis
 - Boom Lifts

Group A and B MEWPs have been further divided into 3 additional classifications:

- **Type 1:** Can only travel in the stowed position and must be moved manually.
- **Type 2:** Controlled from the chassis and can be driven while elevated.
- **Type 3:** Controlled from work platform and can be driven while elevated.

The following chart from NECA's Guide to Aerial lifts provides examples of how the classification system is applied, as well as a description and advantages of each classification.

COMMON NAME	MEWP TYPE/ GROUP	DESCRIPTION/ADVANTAGES
Electric Scissor Lifts	Type 3, Group A	• Provides variable vertical lift/heights • Offers models with variable width platforms and maximum working heights
Rough Terrain Scissor Lifts	Type 3, Group A	• Provides variable vertical lift/heights • Offers models with variable width platforms and maximum working heights • Withstands outside terrain and harsh environments • Can traverse rough outdoor terrain • Higher weight capacity - holds multiple people • Typical reach 26 to 50 feet, some up to 60 feet • Power sources diesel, gas, liquid propane or dual fuel machines. • Performs on slopes 0-40% gradeability, • Four-wheel drive, reinforced tires and positive traction control
Personnel Lifts (man-lift)	Type 1, Group A	• Provides vertical lift in compact spaces • Typical dimensions 35 inches by 29.5 inches • Limited weight capacity - holds one person • Typical working heights 17 to 26 feet (Models with great capacity have wider dimensions) • Easily transported

COMMON NAME	MEWP TYPE/ GROUP	DESCRIPTION/ADVANTAGES
Electric Boom Lifts	Type 3, Group B	• Platform can move beyond base (horizontal and vertical movement) • Compact storage length • Great maneuverability • Self-leveling platforms • Reach heights 30 to 100 feet (Typical 30 and 40) • Booms battery-powered (Large projects will require multiple batteries) • Navigate narrow aisles or tight spaces
Straight Telescopic Booms (stick booms)	Type 3, Group B	• Provides access to hard-to-reach areas • Reaches heights 40 and 80 feet (Specialized booms available to 200 feet) • Typically, platform widths 8 feet or larger, • Stowed height typically under 10 feet • Use diesel or dual fuel. • Rough terrain types available
COMMON NAME	MEWP TYPE/ GROUP	DESCRIPTION/ADVANTAGES
Articulated Knuckle Booms	Type 3, Group B	• Provide more versatility than straight telescopic booms • Can flex around tall objects or obstacles • Horizontal reach is limited to 50-75% of the vertical reach • Reach height approximately 40 feet (Specialized lifts available to 100+ feet) • Fuel may be diesel, gas, liquid propane, dual fuel or electric • Size requires large warehouse or industrial-sized garage to store
Towable Boom Lifts	Type 1, Group B	• Easily transported by standard work truck
Atrium Lifts	Type 1, Group B	• Folds to compact size to squeeze through doorways • Opens easily to high locations - 50 and 70 feet • Provides precise vertical movement. • Power source can be diesel, gas or electric. • Ability to turn bucket 360 degrees

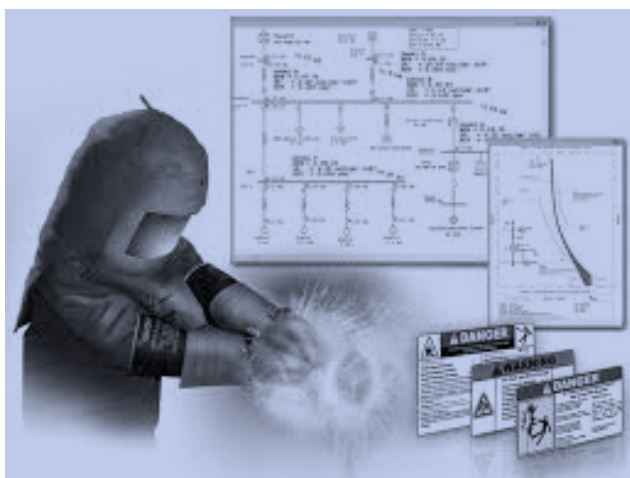
Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Origination	Safety Div.	Vice President		08/01/12
01		Safety Div.	Vice President	03/28/13	04/01/13
02	- Integrated the requirements under the “Purpose Section” into the “Introduction Section” - Updated Scope & Review section to include Customer Requirements for use of an MEWP on their work sites - Updated & reassigned President’s role in this program to the Vice President of Operations - Updated & reassigned the Vice President’s role in this program to Division Managers - Division Managers are responsible for compliance with this program on their work sites - Division Managers are responsible for ensuring all subcontractors are aware of TEI MEWP requirements and verifying their operators are current in training - Division Managers are responsible for periodic audits of their MEWP operators to ensure compliance - Updated & reassigned the Managers role in this program to the Fleet Department	Safety Div.		07/2020	07/01/2020
03	- Updated Introduction & Scope & Review - VP of Operations role in the program is defined - Updated following sections; Operational Requirements, Inspection Requirements, Maintenance Requirements, Records - Inserted Sample Rescue Plan - Added relevant definitions	Safety Div.	Management w/Safety	09/2020	09/2020
04	Added removal of service to failed pre-use inspection	Safety Div.	Management w/Safety	12/2021	12/2021
05	- Updated from aerial lift to MEWP - Inclusion of scissor lift - Multiple changes to wording to eliminate redundancy and wordiness - Added Appendix A: MEWP Class Descriptions - MEWP Rescue Plan removed in favor of TEI Fall Protection Plan - Full list of edits included in 2024 Written Program Updates document	Safety Department	VP of Ops	10/2024	11/2024



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262

(330) 686-2300 F (330) 686-2362



NFPA 70E

Arc Flash Protection

2020 - 2021

Introduction

This program has been established by Thompson Electric, Inc. (*herein referred to as TEI*) in order to:

- Ensure the safety of employees who may work on or near electrical systems.
- Ensure that employees understand and comply with safety standards related to electrical safety and arc flash protection.
- Ensure that employees follow uniform practices during the completion of electrical work.

An arc flash is a “dangerous condition associated with the release of energy caused by an electric arc.”

An arc flash is an explosion causing severe burns, injuries and/or death depending on the severity.

Electricity-related hazards include electric shock and burns, arc-flash burns, arc-blast impacts, and falls.

- **Electric Shock & Burns:** An electric shock occurs when an electric current passes through the body. This can happen when touching an energized part. If the electric current passes across the chest or head, death can result. At high voltages, severe burns can result.
- **Arc-Flash Burns:** An electric arc flash can occur if a conductive object gets too close to a high-amp current source or by equipment failure for instance, while opening or closing disconnects). The arc can heat the air to temperatures as high as 35,000°F, and vaporize metal in the equipment. The arc flash can cause severe skin burns by direct heat exposure and by igniting clothing.
- **Arc-Blast Impacts:** The heating of air and vaporization of metal creates a pressure wave that can damage hearing and cause memory loss (from concussion) and other injuries. Flying metal parts are also a hazard.
- **Falls:** Electric shocks and arc blasts can cause falls, especially from ladders or unguarded scaffolding.

Because electricity is a serious workplace hazard, capable of causing both employee injury and property damage it is the policy of Thompson Electric to protect all employees and the general public from potential electrical hazards. This will be accomplished through compliance with the work practices described in this policy along with effective application of engineering controls, administrative controls, and the use of personal protective equipment.

Policy

This policy establishes the minimum standards to prevent hazardous electrical exposures to personnel, and aid in Thompson Electric Company's compliance with applicable regulatory requirements as defined in OSHA 29 Code of Federal Regulations (CFR) Part 1910, Subpart S, NFPA 70, National Electrical Code, NFPA 70E, Standard for Electrical Safety in the Workplace, ANSI C2, National Electrical Safety Code (NESC), and other established safety standards to reduce or eliminate the dangers associated with the use of electrical energy.

Reading this policy does not qualify the reader to perform electrical work. Guidelines that are beyond the scope of this document must be established at each work site. They should include, as a minimum, the safety concerns outlined in this policy and its related procedures.

This policy is in no way to be construed as a synopsis of all electrical requirements, nor as a substitute for formal study, training and experience in electrical design, construction, and maintenance.

These policies and procedures do not apply to work performed by Qualified Electrical Workers on or directly associated with the following scope of work and/or installations:

- Electrical systems where employees are exposed to live parts under 50 volts and/or those parts that have been de-energized.
- Generation, transmission, and distribution of electric energy located in buildings used for such purposes or located outdoors (this work is covered by 1910.268).
- Communication installations (this work is covered by 1910.268).
- Installations in vehicles.

Due to the nature and level of the hazards involved Thompson Electric has implemented this policy and its related procedures. At Thompson Electric "Safety" is a condition of employment. Non-adherence to this Arc Flash Safety Policy may result in disciplinary action up to and including discharge from employment.

As additional precautions, Thompson Electric has established the following 3 basic guidelines that will apply to any and all work Thompson Electric provides to our Host Employer (i.e., customer) which will also extend to any subcontractors:

1. Thompson Electric shall advise our Host Employer of the unique hazards that our scope of work shall present through a pre-job Job Hazard Analysis which shall be reviewed, and agreed upon, with the Host Employer's designated Project Manager.
2. Thompson Electric shall promptly notify the Host Employer's Project Manager of any unanticipated hazards found during our work that the Project Manager failed to include in the original scope of work and thus the related Pre job Analysis.
3. Thompson Electric shall update the original Job Hazard Analysis to document what measures we take to correct any hazards reported by the Host Employer's Project Manager in order to prevent such hazards from recurring in the future.

The above precautions and policies apply to any and all Thompson Electric work sites.

Clarification of Customer Specific Requirements which exceed OSHA Requirements shall be reviewed by the Division Manager and/or Project Manager with Safety prior to any mobilization of the job to adequately allow for proper planning, training, tools, equipment, PPE that may be required due to the specific customer requirements.

Definitions

Approved - Acceptable to the authority having jurisdiction (AHJ).

Arc Blast - Explosive release of molten material from equipment caused by high-amperage arcs.

Arc Flash Hazard - A dangerous condition associated with the possible release of energy caused by an electric arc.

Arc Flash Hazard Analysis - A study investigating a worker's potential exposure to arc-flash energy, conducted for the purpose of injury prevention and the determination of safe work practices, arc flash protection boundary, and the appropriate levels of personal protective equipment (PPE).

Arc Rating - The maximum incident energy resistance demonstrated by a material (or a layered system of materials) prior to break-open or at the onset of a second-degree skin burn. Arc rating is normally expressed in calories per centimeter squared (cal/cm²). Break-open is a material response evidenced by the formation of one or more holes in the innermost layer of flame-resistant material that would allow flame to pass through the material.

Authorized Lockout/Tagout Employee – A person who locks out and tags out machines, equipment, or systems to perform servicing or maintenance on that machine or equipment. This person must have completed the mandatory training to be qualified as an authorized worker. Only an authorized worker installs and removes his or her own lock(s) and “danger tag(s)” as required by this program.

Conductive - Suitable for carrying electric current.

Confined Space - A confined space by design has limited openings for entry and exit, may lack adequate ventilation, and may contain or produce dangerous air contamination.

Confined Space Classification Table: For the purpose of this plan, all confined spaces will be classified as follows:

Parameters	Class A	Class B	Class C
Characteristics	Immediately dangerous to life. Rescue procedures require the entry of more than one individual fully equipped with life support equipment. Maintenance of communication requires an additional standby person stationed within the confined space.	Dangerous, but not immediately life threatening. Rescue procedures require the entry of no more than one individual fully equipped with life support equipment. Indirect visual or auditory communication with workers.	Potential hazard. Requires no modification of work procedures. Standard rescue procedures. Direct communication with workers from outside the confined space.
% of Oxygen Present	Less than 19.5% or greater than 23.5%.	Less than 19.5% or greater than 23.5%.	19.5% to 23.5%
Flammability Characteristics	10% or greater of LEL (Lower Explosive Limit)	10% or greater LEL (Lower Explosive Limit)	10% or less of LEL (Lower Explosive Limit)
Toxicity	Immediately Dangerous to Life or Health (IDLH)	Greater than contamination level listed in OSHA Standard 1910 Subpart Z, less than IDLH level, but more than the permissible level.	Less than P.E.L. listed in OSHA Standard 1910, Subpart Z.

Damp location - Partially protected locations subject to moderate degrees of moisture, such as some basements.

De-Energized - Free from any electrical connection to a source of potential difference and from electrical charge; not having a potential different from that of the earth.

Disconnect (or Isolating) Switch – A lockable electrical switch that physically disconnects equipment from its input electrical power source.

Dry Location - Locations not normally subject to dampness or wetness, as in the case of a building under construction.

Electrically Hazardous - A condition within the Limited Approach Boundary or Arc Flash Protection Boundary where exposed energized electrical conductors or circuit parts are operating per the following energy levels:

1. 50 Volts or more, with the ability to produce at least 5mA current.
2. Capacitors storing more than 1J (Joules) at 50 Volts or greater; 1000 J at less than 50V.

Electrically Safe Work Condition (see also Verified De-energized)- A state in which the conductor or circuit part to be worked on or near has been disconnected from energized parts, locked/tagged in accordance with established standards, tested to ensure the absence of VOLTAGE, and GROUNDED if determined necessary.

Enclosed - Surrounded by a case, housing, fence, or wall(s) that prevents persons from accidentally contacting energized parts.

Energized - Electrically connected to or having a source of voltage.

Energized Electrical Work - Repair, maintenance, troubleshooting, or testing on electrical circuits, components, or systems while energized (i.e., live). Only Qualified High Voltage Electrical Workers are permitted to work on energized circuitry of 50 volts/25 amps to ground or greater.

Energy Source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Exposed (as applied to energized electrical conductors or circuit parts) - Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to electrical conductors or circuit parts that are not suitably guarded, isolated, insulated, or enclosed.

Flame-Resistant (FR) - The property of a material whereby combustion is prevented, terminated, or inhibited following the application of a flaming or non-flaming source of ignition, with or without subsequent removal of the ignition source.

Flash Protection Boundary - An approach limit at a distance from EXPOSED LIVE PARTS within which a person could receive a second degree burn if an electrical arc flash were to occur.

Grounded - Connected to ground or to a conductive body that extends the ground connection.

Ground Fault Circuit Interrupt (GFCI) - A device whose function is to interrupt the electric circuit to the load when a fault current to ground exceeds a predetermined value that is less than that required to operate the over-current protective device of the supply circuit.

Guarded - Covered, shielded, fenced, ENCLOSED, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach or contact by persons or objects to a point of danger.

Hazardous Location - An area in which an airborne flammable dust, vapor or gas may be present and would represent a hazard if a source of ignition were present (see National Fire Protection Association (NFPA) Class I & II and Division 1 & 2).

Incident Energy - The amount of energy impressed on a surface, a certain distance from the source, generated during an electrical arc event. One of the units used to measure incident energy is calories per centimeter squared (cal/cm²).

Insulated - Separated from other conducting surfaces by a dielectric (including air space) offering a high resistance to the passage of electric current.

Interlock - An electrical, mechanical, or key-locked device intended to prevent an undesired sequence of operations.

Isolating Switch - A switch intended for isolating an electric circuit from the source of power. It has no interrupting rating, and is intended to operate only after the circuit has been opened by some other means.

Labeled - Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspections of production of labeled equipment or materials, and by who's labeling the manufacturer indicates compliance with appropriate standards of performance in a specified manner.

Life Safety Equipment - Equipment that provides critical protection for safety in the event of an emergency or other serious hazard. Life safety equipment, which is electrically energized, should be worked on using Energized Electrical Equipment (EEW) procedures to ensure that the protection provided by the equipment is not lost (e.g., fire alarm and evacuation).

Limited Approach Boundary - An approach limit at a distance from an EXPOSED live part within which a SHOCK HAZARD exists.

Listed - Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states that the equipment, material or services either meets appropriate designated standards or has been tested and found suitable for a specific purpose.

Live Parts (see also Energized) - ENERGIZED CONDUCTIVE components.

Lockout - The placement of a lock on an energy-isolating device according to procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout /Tagout - A standard that covers the servicing and maintenance of machines and equipment in which the unexpected re-energization of the equipment or release of stored energy could cause injury to employees. It establishes performance requirements for the control of such hazardous energy.

Nationally Recognized Testing Laboratory (NRTL) -. Certain private sector organizations recognized by OSHA as an NRTL. That recognition signifies that the organization has met the necessary qualifications specified in the OSHA NRTL program. The NRTL determines that specific equipment and materials (products) meet consensus-based standards of safety to provide assurance that these products are safe for use in the U.S. workplace.

NEC - The National Electric Code NFPA 70.

Overload - Operation of equipment in excess of normal, full-load rating or of a conductor in excess of rated ampacity that, when it persists for a sufficient length of time, would cause damage or dangerous overheating. A fault, such as a short circuit or ground fault, is not an overload.

Prohibited Approach Boundary - An approach limit at a distance from an EXPOSED live part within which work is considered the same as making contact with the live part.

Qualified Electrical Worker – A qualified person trained and knowledgeable of construction and operation of equipment or a specific work method and is trained to recognize and avoid the electrical hazards that might be present with respect to that equipment or work method.

- Qualified electrical workers shall be familiar with the proper use of the special precautionary techniques, personal protective equipment (PPE), including arc-flash, insulating and shielding materials, and insulated tools and test equipment. A person can be considered qualified with respect to certain equipment and methods but is unqualified for others
- An employee who is undergoing on-the-job training and who, in the course of such training, has performed duties safely at his or her level of training and who is under the direct supervision of a Qualified Person shall be considered to be qualified.
- Only a Qualified Electrical Worker (as determined by Thompson Electric) shall be allowed to work on energized circuits.
- Qualified Electrical Workers ***shall not*** be assigned to work alone, except for replacing fused, operating switches, or other operations that do not require the employee to contact energized high voltage conductors or energized parts of equipment, clearing trouble, or emergencies involving hazard to life or property.
 - Whether a person is considered to be a “Qualified” person will depend upon various circumstances in the workplace. It is possible and, in fact, likely for an individual to be considered “qualified” with regard to certain equipment in the workplace, but “Unqualified” as to other equipment.
- An employee who is undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a Qualified Person for the performance of those duties.

Restricted Approach Boundary - An approach limit at a distance from an EXPOSED live part within which there is an increased risk of shock, due to electrical arc over combined with inadvertent movement, for personnel working in close proximity to the live part.

Remote-Control Circuit - Any electric circuit that controls any other circuit through a relay or an equivalent device.

Service - The conductors and equipment for delivering energy from the electricity supply system to the wiring system of the premises served.

Service Equipment - The necessary equipment, usually consisting of a circuit breaker or switch and fuses, and their accessories, located near the entrance of supply conductors to the building and intended to constitute the main control and means of cutoff of the supply.

Setting Up - Any work performed to prepare a machine or equipment to perform its normal production operation.

Switching Devices - Devices designed to close and/or open one or more electric circuits. Included in this category are circuit breakers, cutouts, disconnecting (or isolating) switches, disconnecting means, interrupter switches, and oil (filled) cutouts.

Tagout - The placement of a tagout device on an energy-isolating device according to procedure to indicate that the equipment may not be operated until the tagout device is removed.

Shock Hazard - A dangerous condition associated with the possible release of energy caused by contact or approach to energized electrical conductors or circuit parts.

Verified De-energized (See Also Electrically Safe Work Condition) - A state in which the conductor or circuit part to be worked on or near has been disconnected from energized parts, locked/tagged in accordance with established standards, tested to ensure the absence of VOLTAGE, and GROUNDED if determined necessary.

Voltage (of a Circuit) - The greatest root-mean-square (rms) (effective) difference of potential between any two conductors of the circuit concerned.

Voltage to Ground - For GROUNDED circuits, the voltage between the given conductor and that point or conductor of the circuit that is GROUNDED; for ungrounded circuits, the greatest voltage between the given conductors and any other conductor of the circuit.

Voltage, High - Circuits with a nominal voltage more than 50 volts.

Voltage, Low - Circuits with a nominal voltage less than or equal to 50 volts.

Voltage, Nominal - An approximate value assigned to a circuit or system for the purpose of conveniently designating its voltage class, e.g., 120/240, 480/277, and 600.

Wet Location - Installations subject to saturation with water or other liquids.

Working On (i.e., energized electrical conductors or circuit parts) - Coming in contact with energized electrical conductors or circuit PARTS with the hands, feet, or other body parts, with tools, probes, or with test equipment, regardless of the personal protective equipment a person is wearing.

Effects of Electrical Shocks

Readings	Current	Effects
Safe Current Values	1 mA or Less	Causes no sensation – not felt.
	1 mA to 8 mA	Sensation of shock, not painful; Individual can let go at will since muscular control is not lost.
Unsafe Current Values	8 mA to 15 mA	Painful shock; individual can let go at will since muscular control is not lost.
	15 mA to 20 mA	Painful shock; control of adjacent muscles lost; victim cannot let go.
	50 mA to 100 mA	Ventricular fibrillation – a heart condition that can result in death is possible.
	100 mA to 200 mA	Ventricular fibrillation occurs.
	200 mA and Over	Severe burns, severe muscular contraction – so severe that chest muscles clamp the heart and stop it for the duration of the shock. (This prevents ventricular fibrillation.

- **Delayed Effects:** Damage to the internal tissues may not be apparent immediately after contact with the current. Delayed internal tissue swelling and irritation are possible. Prompt medical attention can help minimize these effects and avoid death or long-term injury.
- **Arc Flash:** When an electric current passes through the air between two conductors, the temperature can reach 35,000°F. Exposure to these extreme temperatures can result in life threatening burns. The majority of hospital admissions due to electrical accidents to Qualified

Employees are from arc flash burns, not electrical shocks. Arc flashes can kill at distances in excess of 10 feet. Equipment that presents an arc flash hazard must be marked with a label describing the available incident energy and level of PPE required for work within the arc flash boundary when the equipment is energized.

- **Arc Blast:** The tremendous temperatures of the arc cause an explosive expansion of both metal and the surrounding air in the arc path. For example, copper expands by a factor of 67,000 times when changed from a solid into a vapor. The dangers of this explosion are of high blast pressure wave, high decibel levels of sound and high velocity shrapnel. The material and molten metal is expelled away from the arc at speeds exceeding 700 miles per hour. Arc blasts often cause severe injuries and death.
- **Burns:** burns suffered in electrical accidents are of two basic types:
 - Electrical Burns – tissue damage (whether skin deep or deeper) occurs because the body is unable to dissipate the heat caused by the current flow. Typically, electrical burns are slow to heal.
 - Thermal Contact Burns – Normally experienced from skin contact with the hot surfaces of overheated electrical conductors.

Other Hazards: Voltage sources that do not have dangerous current capabilities may not pose serious shock or burn hazards in themselves and therefore are often overlooked or ignored. However, voltage sources are frequently used near lethal circuits, and even a minor shock could cause a worker to rebound into a lethal circuit. Such an involuntary reaction often results in bruises, bone fractures, and even death from collision or falls.

- An arc is often created when a short circuit or current flow is interrupted. If the current involved is strong enough, these arcs can cause injury or start a fire. Fires can also be started by overheated equipment or by conductors that carry too much current.
- Extremely high-energy arcs can cause an explosion that sends shrapnel flying in all directions. Even low-energy arcs can cause violent explosions in explosive or combustible atmospheres.

Responsibilities

Senior Management shall be responsible for:

- Establishing and implementing Thompson Electric's Arc Flash Program.
- Ensure all employees are provided with complete arc flash analyses as required by this policy as needed and during equipment replacement or upgrading.
- Place an emphasis on controlling electrical hazards through the application of engineering and design controls whenever possible.
- Promote consistency in how electrical tasks are completed for various customer locations.
- When requested, providing assistance in identifying electrical safety issues.
- Annual (at a minimum) evaluation of the overall effectiveness of the electrical safety program.
- Providing the necessary resources for the Designated Safety Representative in the development and implementation of required written program, training and any related procedures.

Designated Safety Representative (*Corporate or Site Specific*) are responsible for:

- Documented evaluation of work being performed to determine compliance with this program.
- Provide the appropriate training for qualified and unqualified employees.
- Providing awareness training to all employees on recognizing and reporting electrical hazards.
- Develop and maintain a listing of all Qualified Employees at Thompson Electric.
- Periodic review and recommend updates of written program and related procedures to Senior Management.
- Provide and coordinate general training for work crews on the content of this policy and its related procedures.
- Ensuring that PPE supplies and equipment are available and consistent with NIOSH, ANSI, ASME, and other applicable state and federal agencies standards
- Assist work crews in the implementation of this policy and its related procedures.
- Designing and implementing the Electrical Safe Work Practices Training course.
- Evaluation of electrical accidents and incidents to determine trends, and the communication of these findings to management and employees.
- Upon request from any employee (regardless of status) review electrical and electronic equipment, at any Thompson Electric work site from the standpoint of personnel and equipment safety.
- Maintain an electrically safe work environment and take corrective action for potentially hazardous operation or conditions.
- Ensure that all workers are properly protected by means such as instructions, sign, barriers, electrical personal protective equipment (PPE), and appropriate lock and tag devices.
- Work with Human Resources to ensure that workers assigned to potentially hazardous electrical work are physically and mentally able to perform the work.
- Assign a safety watch person when hazardous work is performed.
- Determine if two people are required for an energized work task by OSHA regulations.
- Provide necessary outage time frames so that personnel can provide periodic electrical maintenance and testing of personnel safety devices, such as electrical interlocks and grounding.
- Work with Senior Management, Supervision, Contractors and Customers to plan activities such that work may be performed in a de-energized state whenever possible

Supervisory Personnel are responsible for:

- Maintaining an electrically safe work environment and immediately taking corrective action for potentially hazardous operations or conditions.
- Ensuring that all employees are properly protected by means such as instructions, signs, barriers, electrical Personal Protective Equipment (PPE), and lock and tag devices.
- Working with Human Resources and the Designated Safety Representative to ensure that employees assigned to potentially hazardous electrical work are physically and mentally able to perform their assigned tasks.
 - ***NFPA 70E 130.6(2): When Impaired: Employees shall not knowingly be permitted to work in areas containing live parts operating 50 volts or more or other electrical hazards while their alertness is recognizably impaired due to illness, fatigue, or other reasons.***

- Assigning a Safety Watch Person (SWP) when hazardous work is performed.
- Determine if two people are required for energized electrical work task by OSHA regulations.
 - ***OSHA requires that at least two Qualified Employees shall be present while working on or near (within "Restricted Approach" or "Prohibited Approach") exposed energized parts at or above 600 volts AC.***
- Provide necessary outage time frames so that Qualified Personnel can provide periodic electrical maintenance and testing of personnel safety devices, such as electrical interlocks and grounding.
- Promote electrical safety awareness to all employees.
- Ensure employees comply with ALL provisions of the electrical safety program.
- Ensure employees receive training appropriate to their assigned electrical tasks and maintain documentation of such training.
- Develop and maintain a listing of all qualified employees under their supervision.
- Ensure employees are provided with and use assigned and required protective equipment.
- Plan activities so that work may be performed in a de-energized state whenever possible.
- Ensure employees receive, and successfully complete, training appropriate to their assigned electrical tasks and confirm all related documentation of such training prior to allowing the employee to engage in any electrical work.
- Ensure employees are provided, use, and maintain all assigned personal protective equipment and tools as outlined in this policy and its related procedures.

Employees are responsible for:

- Following the work practices outlined in this policy and its related procedures including the proper selection, use and maintenance of required personal protective equipment.
- Consulting with their immediate supervisor, or if the supervisor is not readily available the Designated Safety Representative, before undertaking a potentially hazardous electrical operation.
- Immediately notifying the Supervisor of any condition, person, or behavior which poses a potential electrical hazard.
- Attending and successfully completing all training required relative to this program.
- Wear and use appropriate electrical personal protective equipment as assigned. See Addendum B for additional guidelines and information.

Safety Watch Person

When deemed appropriate by Supervision or the Designated Safety Representative, a Safety Watch Person (SWP) shall be assigned when hazardous work is performed. The SWP shall:

- Be in visual and audible range of the person performing the work while the work is in progress.
- Be familiar with the work to be performed and the safety procedures involved.
- Observe the employee(s) and operations being performed to prevent careless acts.
- In an emergency, quickly de-energize the equipment and alert emergency rescue personnel.
 - Be equipped with a radio or know the location of the nearest telephone to obtain emergency help.

- Know the location of the corresponding circuit breaker or switch that must be turned off in case of an emergency.
- Complete training in emergency response procedures, including cardiopulmonary resuscitation (CPR).
- Have no other duties that preclude observing employees and operation, and rendering aid if necessary.

TEI Employees, our Sub-Contractors and their Tiered Sub-Contractors are responsible for:

- Complying, at a minimum, with the procedures and work practices outlined in TEI's Arc Flash policy.
 - Senior Management along with the Designated Safety Representative are responsible for ensuring that all Affected Sub-Contractors and their Tiered Sub-Contractors operating under the direct supervision of Thompson Electric are informed of and adhere to this policy and its related procedures. Specifically, in regards to construction related activities.
- While working on the Host Employer property, they will abide by the established minimum approach distances.
 - Addressing, and documenting, all established minimum approach distances (including host employer's if stricter) on the pre-job Task Hazard Analysis and that all affected employees (regardless of status) have reviewed them, understand them and will abide by them.
- TEI site management shall ensure that each affected employee, to the extent that other safety-related conditions at the worksite permit, works in a position from which a slip or shock will not bring the employee's body into contact with exposed, uninsulated parts energized at a potential different from the employee's.
 - The Qualified Electrician responsible for the pre-job Task Hazard Analysis, shall "walk-down" the work area with the affected employees prior to the creation and review of the pre-job Task Hazard Analysis to ensure that this is appropriately addressed and the precautions to be taken documented on the Task Hazard Analysis prior to the start of any work.
- While working on the Host Employer property, TEI site management will obtain incident heat energy calculations of existing equipment TEI affected employee's will be working on from the Host Employer (i.e., customer).
 - The Qualified Electrician responsible for the pre-job Task Hazard Analysis, shall document and review the heat energy calculations of the identified equipment with the affected employees prior to the creation and review of the pre-job Task Hazard Analysis to ensure that this is appropriately addressed and the precautions to be taken documented on the Task Hazard Analysis prior to the start of any work

TEI Employees, our Sub-Contractors and their Tiered Sub-Contractors are responsible for:

- TEI site management shall ensure that devices used by employees to open and close circuits under load conditions are designed to interrupt or carry the current involved.
 - The Qualified Electrician responsible for the pre-job Task Hazard Analysis, shall inspect and list the devices to be used on the Task Specific pre-job Task Hazard Analysis. He/She will be responsible for ensuring that only these identified devices are used in the scope of the work.
- TEI Site Management shall ensure that TEI Safety and the Project Manager are made aware, immediately, of any and all violations of the above.

Training, Qualification & Authorization

- All employees who face a risk of electrical hazard that is not reduced to a safe level shall be trained.
 - Training shall be performed before an employee is initially assigned duties involving work around or on electric systems.
 - The level of electrical safety training provided is dependent on whether the employee is classified as a “Qualified Employee” or “Unqualified Employee”.
 - Thompson Electric reserves the right to consider an employee “Qualified” with respect to certain equipment and methods, but “Unqualified” for others.
 - If a question or concern concerning an employee’s status should arise the Designated Safety Representative shall be consulted. In his or her absence Senior Management shall be contacted for resolution.
- Only those persons who are both qualified and authorized may install, fabricate, repair, test, calibrate, or modify electrical or electronics wiring, devices, systems, or equipment.
- Only those persons who are both qualified and authorized may enter areas/spaces that are required to be accessible to Qualified Employees only (as defined in this plan, i.e., restricted approach boundaries, etc.) unless the electric conductors and equipment involved are in an electrically safe work condition. Violators shall be promptly removed and reported to the site supervisor.
- A qualified and authorized person is an individual formally recognized as:
 - Having completed the required Thompson Electric classroom training.
 - Having sufficient understanding of a device, system, piece of equipment, or facility to be able to recognize and positively control any hazards it may present.
 - Have successfully completed site, area, facility, equipment and apparatus specific training.
 - Possess the work experience and formal training necessary to execute the work according to recognized and accepted technical standards.
 - Whose qualifications are documented by his or her supervisor.
 - A person can be considered qualified and authorized with respect to certain equipment and methods but not authorized for others.

At a minimum all Employees (including unqualified) shall be trained in the inherent hazards of electricity and any safety related work practices and procedural requirements as necessary to provide protection from the electrical hazards associated with their respective jobs. All employees will be trained to identify and understand the relationship between electrical hazards and possible injury.

- Any and all training outlined in this policy and related procedures shall be performed (at a minimum) at intervals not to exceed 3 years.

General Guidelines for Qualification

Qualification for electrical or electronics work is determined by the employee’s Supervisor, the Designated Safety Representative and in some cases Senior Management. Qualification shall be based on a combination of LBNL classroom training (including required periodic retraining), formal electrical trade, military, college or other training, work experience, and on-the-job training.

- Formal training can be the completion of apprenticeship or comparable training.
- Experience may be a combination of, or include, formal technical related education courses, hand-on field or classroom lab work that may or may not result in licenses or certifications.

On-going electrical and electronics training must include an annual review of this Policy and all Appendices pertinent to the employee’s work assignment (i.e., Lockout/Tagout, Job Hazard Analysis,

Confined Space, etc.) For specific work requirements the supervisor may add classes to the employee's training course list not required by the initial JHA, but deemed important by the supervisor.

General Guidelines for Authorization

Authorization to perform electrical or electronics work by an employee is determined by the employee's Line Management and Supervision, and is based on the skills, knowledge, and ability of the employee to perform a specific task safely and correctly.

All Contractors and Subcontractors working at any and all work sites operated by Thompson Electric are required to comply with the procedures and work practices outlined in this policy.

- Senior Management is responsible for ensuring that said individuals/organizations, operating under the supervision of the Site Supervisor, are informed of and adhere to Thompson Electric's Arc Flash Protection Policy.

On-The-Job Training

- On-the-job training for specified equipment or classes of equipment must be documented to ensure that training is adequate and consistent for all employees with similar tasks. This documentation must be reviewed and approved by a Competent Person who is knowledgeable in safe electrical work practices, and is familiar with the hazards involved in the apparatus. Training shall include, but not be limited to:
 - Features of the equipment, including any specialized configuration.
 - Location of all energy sources to, and within, the equipment.
 - Location of all energy-isolating devices.
 - Techniques, tools, and personal protective equipment (PPE) including arc-flash PPE used for the specific equipment and/or job task.
 - Relevant documents such as wiring diagrams, schematics, service manuals, and operating, testing, and calibration procedures.
 - The system's energy control procedures, including energy-isolating devices, grounding and shorting procedures, and other energy-control procedures.
 - Specific operations in which energized work is anticipated (if any), and the process to obtain authorization.
 - Approved approach distances as specified in NFPA Table 130.2 and the criteria for basing the decision for determination of degree and extend of the hazard and the required PPE for safe work performance (i.e., complete Thompson Electric's Pre-Job Analysis).

Task Specific Training Criteria

- Supervisory personnel shall use the following guidelines to determine whether an individual is qualified to perform specific electrical work. Different subsets of these criteria shall be selected according to the exact nature of the task. Tasks that are performed less often than once per year, shall require retraining of all Affected and Authorized Employees before the performance of the work practices involved.
- The Supervisor shall authorize the employee to perform the work task only if he/she is satisfied that all of the relevant criteria are met. If the supervisor cannot verify an employee's qualifications, assistance from the Designated Safety Representative should be obtained.

Criteria and Documentation of Training (Requirements for Qualified Employee)

- Documentation of an employee's individual qualifications shall contain:
 - Description of the scope of the work task being considered.
 - Employee's ability to identify all possible hazards associated with this task.
 - Employee's experience in the selection and use of test equipment for this task.
 - Individual's ability to locate and read the appropriate engineering documents for the equipment.
 - Employee's knowledge of how to check the equipment calibration, condition, and operation.
 - Employee's knowledge of how to shut down, isolate, and verify all sources of hazardous energy.
 - Employee's ability to identify, interpret, and implement all applicable codes (i.e., NFPA 70E, NEC) and standards pertaining to the task.
 - Employee's experience and training to independently distinguish correct construction techniques from incorrect construction techniques.
 - Employee's experience and training to select the correct materials and components, and to use them in a manner consistent with their manufacture and/or listing.
 - Employee's ability to distinguish between acceptable and unacceptable equipment-grounding techniques.
 - The employee's familiarity with specific equipment grounding requirements for this apparatus.
 - Employee's experience, training and ability to predict likely failure modes of a particular construction, and to properly mitigate the effects of such failures.
 - Employee's knowledge of the proper use of the special precautionary techniques, personal protective equipment, including arc-flash, insulating and shielding materials, and INSULATED tools and test equipment (including instrument limitations).
- All training shall be documented and maintained for the duration of the employee's employment plus 5 years and shall include content of training, each employee's name, date of training.

Additional Training Requirements (for Qualified Persons)

- **If the employee is working within the LIMITED APPROACH BOUNDARY of EXPOSED ENERGIZED parts operating at 50 volts or more** the employee shall receive, at a minimum, additional training in:
 - Skills and techniques required to distinguish EXPOSED ENERGIZED parts from other parts of ELECTRICAL EQUIPMENT.
 - Skills and techniques required to determine the nominal VOLTAGE of EXPOSED ENERGIZED parts.
 - Approach distances specified in NFPA 70E and the corresponding VOLTAGES to which the QUALIFIED PERSON will be exposed (Appendix A).
 - Decision-making process necessary to determine the degree and extent of the hazard and the personal protective equipment (PPE) and job planning necessary to perform the task safely.
 - Qualified Electrical Workers must also be trained in recognizing signs and symptoms of electric shock, heart fibrillation, electric burns, and proper first aid protocols for these conditions. They must have the following training:
 - Basic Cardio Pulmonary Resuscitation (CPR);
 - Automatic External Defibrillator (AED); and
 - Contacting emergency personnel and basic first aid.
 - The approach distances specified in Table 130.2(C) and the corresponding voltages to which the qualified electrical worker will be exposed.

Re-Training Requirements

- All employees and sub-contractor employees shall receive re-training or additional training if:
 - Supervision or annual inspection indicate that an employee is not complying with the safety related work practices outlined in this policy and related procedures.
 - If new technology, new types of equipment, or changes in procedures necessitate the use of safety-related work practices that are different from those that the employee would normally use.
 - If he/she must employ safety-related work practices that are not normally used during his/her regular job duties.
 - Customer requires additional training.

Skills and techniques required to distinguish EXPOSED ENERGIZED parts from other parts of ELECTRICAL EQUIPMENT

Safety Watch Person Authorization & Qualification

Certain work requires two QUALIFIED PERSONS. This occurs when work is considered electrically hazardous. When the "Two-Person Rule" is required, both workers must be present at the work site, and each worker must be aware of the other worker's tasks and must:

- Be a qualified person.
- Be able to de-energize equipment.
- Know the location of nearest telephones, and how to alert emergency rescue personnel.
- Be able to free an injured worker from the hazard.
- Be trained and current in cardiopulmonary resuscitation (CPR).
- Be trained and current in First Aid.
- Remain in visual and audible contact with the workers performing the work.

Note: Both workers may perform separate work tasks so long as safety is not compromised.

Exemption to (2) Two Qualified Persons

Under limited conditions, the electrical "Two-Person" rule may allow for a second person that is not a QUALIFIED PERSON. All of the remaining requirements of those listed above apply, and in addition the following must be met:

- Management must approve this exemption.
- During the briefing process the QUALIFIED PERSON will assess the qualifications of the second person to determine that the work may proceed safely.
- The second person must be First Aid and CPR trained.
- The second person may not enter the LIMITED APPROACH BOUNDARY or the FLASH PROTECTION BOUNDARY.
- The electrical disconnecting means must be located outside of the limited approach boundary and the flash protection boundary.
- The electrical disconnect must be located within 50 feet of the second person.
- The second person must be briefed in emergency procedures and the electrical work being performed.

Note: This exemption only applies to the Two Person Rule, and shall not be used when an Electrical Safety Watch is required.

Electrical Safety Watch

A Safety Watch is a *more stringent* hazard control measure than the Two-Person Rule and must be implemented when there are grave consequences from a failure to follow safe-work procedures. This occurs when work is considered high-hazard electrical work, as established by the conditions in Appendix Q or by the work supervisor. When a Safety Watch is required, the Safety Watch must be a QUALIFIED PERSON who is responsible for monitoring the qualified person(s) doing the work. A Safety Watch must:

- Be a QUALIFIED PERSON
- Have no other duties that preclude continually observing, coaching, and monitoring for potential hazards and mistakes
- Have a thorough knowledge of the specific working procedures to be followed and the work to be done; and
- Be close enough to the work in progress to safely monitor the progress and methods of the QUALIFIED PERSON doing the work: the Safety Watch must use clothing and PPE appropriate to the hazard and the distance from the work in progress. In no case should the Safety Watch be more than 50 feet from the qualified person (s) performing the work.
- Ensure only QUALIFIED PERSONS are allowed to enter the LIMITED APPROACH BOUNDARY.
- Ensure that the Limited Approach Boundaries are properly barricaded and controlled. If signs and barricades do not provide sufficient warning and protection for the Limited Approach Boundary, an attendant, (third person), shall be stationed to warn and prevent unqualified persons from entering.

Qualified Electrical Worker

A qualified person trained and knowledgeable of construction and operation of equipment or a specific work method and is trained to recognize and avoid the electrical hazards that might be present with respect to that equipment or work method.

- Qualified electrical workers shall address all special precautionary techniques, personal protective equipment (PPE), including arc-flash, insulating and shielding materials, and insulated tools and test equipment as well as any barricading, signage, etc. on the pre-job Task Hazard Analysis. If any condition changes at any time, the work shall immediately cease and the THA shall be updated and reviewed accordingly with all affected Qualified Electrical Workers on the team.
- Only a Qualified Electrical Worker (as determined by Thompson Electric's Division Management) is authorized to work on, and in, areas containing unguarded, exposed energized lines or parts of equipment. - ***(for additional clarification of a Qualified Electrical Workers' duties, responsibilities, etc. see the definitions section of this policy).***
- Qualified Electrical Workers ***shall not*** be assigned to work alone, except for replacing fused, operating switches, or other operations that do not require the employee to contact energized high voltage conductors or energized parts of equipment, clearing trouble, or emergencies involving hazard to life or property.
 - Whether a person is considered to be a "Qualified" person will depend upon various circumstances in the workplace. It is possible and, in fact, likely for an individual to be considered "qualified" with regard to certain equipment in the workplace, but "Unqualified" as to other equipment.
- An employee who is undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a Qualified Person for the performance of those duties.

Personal Protective Equipment

General Requirements

- Employees working in areas where electrical hazards are present shall be provided with, and shall use, protective equipment (Arc Flash Gear) that is designed and constructed for the specific body part to be protected and for the work to be performed.
- Thompson Electric will provide electrical protective equipment (i.e., Arc Flash Gear) required by this program at no cost to employees. Such equipment shall include an Arc Flash rated apparel, eye protection, head protection, hand protection, insulated footwear, and face shields where necessary. Thompson Electric is not responsible for providing under layers of clothing.
- PPE (including insulating PPE) must be maintained in a safe, reliable condition and be inspected for damage before each day's use and immediately following any incident that can reasonably be suspected of having caused damage.
- Employees shall wear nonconductive ANSI approved head protection whenever there is a danger of a head injury from electric shock or burns due to contact with live parts or from flying objects resulting from an electrical explosion.
- Employees shall wear nonconductive protection for the face, neck, and chin whenever there is danger of injury from exposure to electric arcs or flashes or from flying objects resulting from an electrical explosion.
- Employees shall wear protective equipment for the eyes and face whenever there is a danger of injury from electric arcs, flashes, or from flying objects resulting from an electrical explosion.
- Employees shall wear rubber-insulating gloves where there is a danger of hand and arm injury due to contact with live parts or possible exposure to arc flash burn.
- Where insulated footwear is used as protection against step and touch potential, dielectric overshoes shall be required. Insulated soles shall not be used as primary electrical protection
- Face shields without arc rating shall not be used for use for electrical work.
 - Safety glasses or goggles must always be worn underneath face shields.
 - Additional illumination may be needed when using tinted face shields as protection during electrical work.
- Electrical Protective Equipment must be selected to meet the criteria established by the American Society of Testing and Materials (ASTM) and by the American National Standards Institute (ANSI).
- Thompson Electric shall develop and maintain a listing of the specific PPE requirements for each energized electrical task conducted by their employees using the form found in Appendix F of this document.

Flash Protection Boundary

- Personal protective equipment shall be provided to and used by all employees working within the "Flash Protection Boundary".
- For systems that are 600 volts or less the Flash Protection Boundary shall be a minimum of four feet.
- For systems that are above 600 volts, the Flash Protection Boundary shall be determined through engineering analysis.

- The specific protective equipment to be worn within the Flash Protection Boundary can be determined by either of the following:
 - Complete a flash hazard analysis that determines the incident exposure energy of each employee. Appropriate protective clothing can then be selected based on the calculated exposure level.
 - Determine the hazard level of the task by referring to NFPA 70E Table 130.7(C)(9)(a), “Hazard/Risk Category Classifications” (Appendix B of this policy). This table also indicates whether voltage-rated gloves and/or tools need to be used. Once the hazard level of the task has been determined, the required PPE can then be ascertained from NFPA 70E Table 130.7(C)(10), “Protective Clothing and PPE Matrix” (Appendix E of this policy).

Flame-Resistant (FR) Apparel & Under Layers

- FR apparel shall be visually inspected before each use. FR apparel that is contaminated or damaged shall not be used. Protective items that become contaminated with grease, oil, flammable liquids, or combustible liquids shall not be used.
- The garment manufacturer’s instructions for care and maintenance of FR apparel shall be followed.
- When FR apparel is worn to protect an employee, it shall cover all ignitable clothing and allow for movement and visibility.
- Non-melting, flammable garments (i.e., cotton, wool, rayon, silk, or blends of these materials) may be used as under layers beneath FR apparel.
- Meltable fibers such as acetate, nylon, polyester, polypropylene, and spandex shall not be permitted in fabric under layers next to the skin.
 - An incidental amount of elastic used on non-melting fabric underwear or socks shall be permitted.
- FR garments worn as outer layers over FR apparel (i.e., jackets or rainwear) must also be made from FR material.
- Flash suits must permit easy and rapid removal by the user.

Rubber Insulating Equipment

- Rubber insulating equipment includes protective devices such as gloves, sleeves, blankets and matting.
- Insulating equipment must be inspected for damage before each day’s use and immediately following any incident that could have caused damage.
- An air test must be performed on rubber insulating gloves before each use.
- Where the insulating capability of protective equipment is subject to damage during the use, the insulating material shall be protected by an outer covering of leather or other appropriate material.
- Rubber insulating equipment must be tested according to the schedule contained in Appendix D.
- Rubber insulating equipment must be stored in an area protected from light, temperature extremes, excessive humidity, ozone, and other substances and conditions that may cause damage.

Specific Personal Protective Equipment Selection & Maintenance Guidelines

- Personal protective equipment is required when installing, examining, adjusting, servicing, fabricating, testing, or maintaining electrical equipment. The Safety Manager and Site Supervisor shall provide employees with appropriate PPE, and shall ensure that the equipment is used properly. PPE shall meet the following ANSI and ASTM Standards:

Protective Equipment or Apparel	ASTM Standard	ANSI Standard
Rubber, Insulating Gloves	D 120	–
Rubber, Insulating Matting	D 178	–
Rubber, Insulating Blankets	D 1048	–
Rubber, Insulating Covers	D 1049	–
Rubber, Insulating Line Hose	D 1050	–
Rubber, Insulating Sleeves	D 1051	–
Protective Foot Wear	–	Z41
Eye and Face Protection	–	Z87.1
Nonconductive Hard Hats (Helmets)	–	Z89.2
Leather Protectors For Rubber Insulating Gloves	F 696	–

- To prevent injury from exposure to electrical hazards, it's important that all electrical personal protective equipment (PPE) and electrical equipment be maintained in a safe, reliable condition. All Insulating PPE shall be inspected prior to each use. Electrical equipment includes, but is not limited to:
- Nonconductive hard-hats, gloves, and foot protection or insulating mats.
 - Eye and face protection whenever there is danger from electric arcs or flashes.
 - Insulated tools or handling equipment.
 - Protective shields and barriers to protect against electrical shock and burns.
- Two types of rubber insulating gloves will be used by Thompson Electric as a portable device for protecting employees from contact with live electrical conductors:
- Low voltage, Type I (being non-resistant to ozone breakdown), Class 0 (capable of withstanding 5,000 volts);
 - High voltage, Type I (being none-resistant to ozone breakdown), Class I (capable of withstanding (10,000 volts).
- **Rubber gloves** are required to prevent employee electrocution from accidental contact with energized equipment. Rubber gloves shall not be used as primary protection. Primary protection measures include grounding and deactivation.
- To make sure electrical protective equipment actually performs as designed, it must be inspected for damage prior to each use, and immediately following any incident that can reasonably be suspected of having caused damage.

- Insulating gloves must be given an air test, along with the inspection.
- Each glove must be conspicuously marked with last test date and expiration date.
- All electrical protective equipment, made of rubber, should meet the established safety standards and specifications outlined in the table below:

Table 7.4.5

Rubber Insulating Equipment Voltage Requirements			
Class of Equipment	Maximum Use Voltage (1) a – c - rms	Retest Voltage (2) a – c - rms	Retest Voltage (2) d – c - avg
0	1,000	5,000	20,000
2	17,000	20,000	50,000
4	36,000	40,000	70,000
Footnote(1) The maximum use voltage is the a-c voltage (rms) classification of the protective equipment that designates the maximum nominal design voltage of the energized system that may be safely worked. The nominal design voltage is equal to the phase-to-phase voltage on multiphase circuits. However, the phase-to-ground potential is considered to be the nominal design voltage: [1] If there is no multiphase exposure in a system area and if the voltage exposure is limited to the phase-to-ground potential; or [2] If the electrical equipment and devices are insulated or isolated or both so that the multiphase exposure on a grounded wye circuit is removed. Footnote(2) The proof-test voltage must be applied continuously for at least 1 minute, but no more than 3 minutes.			

- **Testing of Rubber Insulated Gloves.** Rubber insulating gloves will be tested annually to ensure that their protective ability against shock has not been compromised. The testing will be performed by a certified testing company (chosen by the Safety Manager). The gloves will be approved and stamped for use or replaced when necessary.
- **Use of Rubber Matting.** Employees working on energized or potentially dangerous equipment will be provided with rubber matting on which to stand. This matting will be capable of withstanding an electrical charge of 30,000 volts.
- **Rubber Matting Replacement.** Rubber matting will be replaced on an annual basis (without testing) to ensure its capability to eliminate injury.
- Rubber-insulated (nonconductive) protective equipment shall be visually inspected;
 - At the beginning of each workday;

- Before each use; and
 - Immediately following any incident that can reasonably be suspected of having caused damage.
 - This inspection shall include an air test of the gloves used. Hot sticks, grounds, aerial-lift equipment and booms, hot rope, and hot ladders shall also be visually inspected as specified by the individual manufacturer's guidelines.
- **Defects** – Insulating equipment must not be used if any of the following defects are detected:
- A hole, tear, puncture, or cut;
 - Ozone cutting or ozone checking (the cutting action produced by ozone on rubber under mechanical stress can turn into a series of interlacing cracks);
 - An embedded foreign object;
 - Any of the following texture changes: swelling, softening, hardening, or becoming sticky or inelastic; and
 - Any other defect that damages the insulating properties.
 - Insulating equipment found to have other defects that might affect its insulating properties must be removed from service and returned for testing.
 - Insulating equipment must be cleaned as needed to remove foreign substances, and stored in such a location and in such a manner as to protect it from light, temperature extremes, excessive humidity, ozone, and other injurious substances and conditions.
- **Gloves:**
- **Protector Gloves** must be worn over insulating gloves, except when using Class 0 gloves, under limited use conditions, (and when the limited use condition is pre-approved by the Division Manager and Safety) where small equipment and parts manipulation necessitate unusually high finger dexterity.
 - **NOTE: Extra care must be taken while visually examining the glove, and make sure employees are instructed not to avoid handling sharp objects in this type of situation.**
 - Any other class of glove may be used for similar work without protector gloves if the Supervisor can demonstrate that the possibility of physical damage to the insulating gloves is small and if the class of glove is one class higher than that required for the voltage involved.
 - Insulating gloves that have been used without protector gloves **may not** be used at a higher voltage until they have been tested.
 - **Leather Gloves** - Leather gloves will be worn over insulating gloves to ensure the insulating gloves are not punctured or damaged during their use.
- **Testing** – Electrical protective equipment must be subjected to periodic electrical tests. Test voltages and the maximum intervals between tests must be in accordance with Table 7.4.5 and Table 7.11.1:

Table 7.11.1

Rubber Insulating Equipment Test Intervals	
Type of Equipment	When To Test
Rubber Insulating Line Hose	Upon indication that insulating value is suspect.
Rubber Insulating Covers	Upon indication that insulating value is suspect.
Rubber Insulating Blankets	Before first issue and every 12 months thereafter (1).
Rubber Insulating Gloves	Before first issue and every 6 months thereafter (1).
Rubber Insulating Sleeves	Before first issue and every 12 months thereafter (1).
Footnote(1) If the insulating equipment has been electrically tested but not issued for service, it may not be placed into service unless it has been electrically tested within the previous 12 months.	

- The test method used must reliably indicate whether the insulating equipment can withstand the voltages involved.
 - Repaired insulating equipment must be retested before it may be used by any Thompson Electric employee (regardless of status).
 - If the insulating equipment fails to pass inspections or electrical tests it may not be used by employees, except as follows:
 - Rubber insulating line hose may be used in shorter lengths with the defective portion cut off.
 - Rubber insulating blankets may be repaired using a compatible patch that results in physical and electrical properties equal to those of the blanket.
 - Rubber insulating blankets may be salvaged by severing the defective area from the undamaged portion of the blanket. The resulting undamaged area may not be smaller than 22 inches x 22 inches (560mm by 560mm) for Class 1,2,3, and 4 blankets.
 - Rubber insulating gloves and sleeves with minor physical defects (i.e., small cuts, tears, or punctures) may be repaired by the application of a compatible patch.
 - Rubber insulating gloves and sleeves with minor surface blemishes may be repaired with a compatible liquid compound.
 - All patched areas, on rubber insulating equipment, must have electrical and physical properties equal to those of the surrounding material.
 - Repairs to gloves are permitted only in the area between the wrist and the reinforced edge of the opening.
- **Rubber Insulating Equipment Certification** – Thompson Electric must certify that equipment has been tested in accordance with the requirements of the standard, and the certification must identify the equipment that passed the test and the date it was tested.
- Each glove must be conspicuously marked with last test date and expiration date.

Insulated Tools and Materials and Test Instruments

- Only insulated tools and equipment shall be used within the Limited Approach Boundary of exposed energized parts.
 - Tools and handling equipment should be replaced if the insulating capability is decreased due to damage
- Insulated tools shall be rated for the voltages on which they are used.
- Insulated tools shall be designed and constructed for the environment to which they are exposed and the manner in which they are used.
- Insulated tools shall be protected from damage and degradation of the integrity of the insulation.
- Fuse or fuse holder handling equipment, insulated for the circuit voltage, shall be used to remove or install a fuse if the fuse terminals are energized.
- When test instruments are used for the testing for the absence of voltage on conductors or circuit parts operating at 50 volts or more, the operation of the test instrument shall be verified before and after an absence of voltage test is performed.
- Ropes and hand lines used near exposed energized parts shall be non-conductive.
- Portable ladders used for electrical work shall have non-conductive side rails.
- Protective gloves must be used when employees are working with exposed electrical parts above fifty (50) volts.
- Test instruments, equipment, and their accessories shall meet the requirements of ANSI/ISA-61010-1 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory use – Part 1 General Requirements for rating and design requirements for voltage measurements and test instruments intended for use on electrical systems 1000 Volts and below.
- Protective shields, barriers or insulating materials must be used to protect each employee from shock, burns, or other electrical injuries while that person is working near exposed energized parts that might be accidentally contacted or where dangerous electric heating or arcing might occur.



Alerting Techniques

- Barricades shall be used in conjunction with safety signs to prevent or limit access to work areas containing live parts.
 - Conductive barricades shall not be used where they might cause an electrical hazard.
 - Barricades shall be placed no closer than the Limited Approach Boundary.
- Barricades, such as plastic fencing, must be in place if workers have to leave energized parts exposed over 600 volts.
- If signs and barricades do not provide sufficient protection, an Attendant will be assigned to warn and protect individuals.
 - The primary duty of the Attendant shall be to keep unqualified persons out of the work area where an electrical hazard exists.
 - The Attendant shall remain in the area as long as there is a potential exposure to electrical hazards.

Energized Electrical Equipment Safety Program Implementation

Equipment Labeling

- Article 110.16 of the NEC 2002 code **requires** switchboards, panel boards, industrial control panels, and motor control centers **to be field marked** to warn workers of potential electric arc flash hazards.
- The term Industrial Control Panel covers every enclosure that may contain exposed energized conductors or components.
- Marking is intended to reduce the occurrence of serious injury or death due to arcing faults to workers working on or near energized electrical equipment.
- Markings (labels) shall be located so they are visible to the personnel before examination, adjustment, servicing, or maintenance of the equipment.
- Labels shall be either of the 2 examples (or similar) shown in Figure 1 depending on the available resources of the agency.
- The first DANGER label shall be used when information is not presently available. This is the minimum NEC 110.16 requirement.
- The DANGER label should remind a qualified worker who intends to open the equipment for analysis or work:
 - Electric arc flash hazard exists
 - Turn off all power before opening
 - Follow all requirements of NFPA 70E for safe work practices and wear appropriate personal protective equipment (PPE) for the specific hazard.
- The second DANGER label shall be used when a qualified electrical worker or electrical engineer determines the values of the shock and flash protection information.
- When arc flash and shock data are available for industrial control panels, labels shall include:
 - Information on flash hazard boundary
 - The hazard category
 - Required PPE
 - Minimum arc rating
 - Limited approach distances
 - Restricted approach distances
 - Prohibited approach distances.
- An unqualified person must not be near open energized equipment.

Implementation Procedures

- Immediately place danger labels on equipment required to be labeled by NEC 110.16.
- Until an arc flash hazard analysis can be made, a Qualified Electrical Worker using NFPA Table 130.7(C)(9)(a), Hazard/Risk Category Selections, shall for each situation:
 - Determine the hazard/risk category
 - Determine the use of V-rated gloves
 - V-rated gloves are gloves rated and tested for the maximum line-to-line voltage upon work will be done.
 - Determine the use of V-rated tools
 - V-rated tools are tools rated and tested for the maximum line-to-line voltage upon work will be done.

- Thompson Electric shall complete an arc flash hazard analysis as required by NFPA 70E.
- The arc flash hazard analysis shall only be completed by a licensed Electrical Engineer.
- The arc flash hazard analysis shall be completed on all major electrical system upgrades or renovations.
- The arc flash hazard analysis is a responsibility of the DOA Division of State Facilities.
- The arc flash hazard analysis shall be done for all new electrical system installations.
- This is a responsibility of Senior Management.
 - Senior Management shall conduct an audit on the condition of existing electrical equipment and have an arc flash hazard analysis performed when considered immediately necessary. Reasons for conducting the analysis include the following:
 - Some equipment may be old, possibly in poor condition creating a greater potential for flashover.
 - Equipment is requiring greater than average maintenance.
 - Frequent use of high hazard/risk category personal protective equipment during the conduct of maintenance. Qualified electrical workers are frequently wearing high hazard/risk PPE.

Arc Flash Hazard Analysis

- An arc flash hazard analysis includes the following:
 - Collect data on the facility's power distribution system.
 - Arrangement of components on a one-line drawing with nameplate specifications of every device.
 - Lengths and cross-section area of all cables.
 - Contact the electric utility for information including the minimum and maximum fault currents that can be expected at the entrance to the facility.
 - Conduct a short circuit analysis followed by a coordination study is performed.
 - Feed the resultant data into the NFPA 70E-2000 or IEEE Standard 1584-2002 equations.
- These equations produce the necessary **flash protection boundary distances** and **incident energy** to determine the minimum PPE requirement.
- The **flash protection boundary** is the distance at which PPE is needed to prevent incurable burns (2nd degree or worse) if an arc flash occurs. (It is still possible to suffer 1st or 2nd degree burns.)
 - Systems of 600 volts and less, the flash protection boundary is 4 feet, based on an available bolted fault current of 50 kA (kilo amps) and a clearing time of 6 cycles (0.1 seconds) for the circuit breaker to act, or any combination of fault currents and clearing times not exceeding 300 kA cycles (5000 ampere seconds).
 - For other fault currents and clearing times, *see* NFPA 70E.

Extension Cords

Improper use of extension cords can lead to shock hazards. In addition, use of an undersized extension cord results in an overheated cord and insufficient voltage delivered to the device, thus causing device or cord failure and a fire hazard.

- At Thompson Electric all extension cords must be approved by Underwriter Laboratories or another Nationally Recognized Testing Laboratory (see below):



- Extension cords may only be used to provide temporary power.
- Portable cord-and-plug connected equipment and extension cords must be visually inspected before use on any shift for external defects such as loose parts, deformed and missing pins, or damage to outer jacket or insulation, and for possible internal damage such as pinched or crushed outer jacket. Any defective cord or cord-and-plug-connected equipment must be removed from service and no person may use it until it is repaired and tested to ensure it is safe for use.
- Extension cords must be of the three-wire type. Extension cords and flexible cords must be designed for hard or extra hard usage (for example, types S, ST, and SO). The rating or approval must be visible.
- Job-made extension cords are forbidden per the electrical code.
- Personnel performing work on renovation or construction sites using extension cords or where work is performed in damp or wet locations must be provided, and must use, a ground-fault circuit interrupter (GFCI).
- Portable equipment must be handled in a manner that will not cause damage. Flexible electric cords connected to equipment may not be used for raising or lowering the equipment.

- Extension cords must be protected from damage. Sharp corners and projects must be avoided. Flexible cords may not be run through windows or doors unless protected from damage, and then only on a temporary basis. Flexible cords may not be run above ceilings or inside or through walls, ceilings or floors, and may not be fastened with staples or otherwise hung in such a fashion as to damage the outer jacket or insulation.
- Cords must be covered by a cord protector or tape when they extend into a walkway or other path of travel to avoid creating a trip hazard.
- Extension cords used with grounding-type equipment must contain an equipment-grounding conductor (i.e., the cord must accept a three-prong, or grounded, plug).
- Attachment plugs and receptacles may not be connected or altered in any way that would interrupt the continuity of the equipment grounding conductor. Additionally, these devices may not be altered to allow the grounding pole to be inserted into current connector slots. Clipping the grounding prong from an electrical plug is prohibited.
- Flexible cords may only be plugged into grounded receptacles. The continuity of the ground in a two-prong outlet must be verified before use. It is recommended that the receptacle be replaced with a three-prong outlet. Adapters that interrupt the continuity of the equipment grounding connection may not be used.
- All portable electric equipment and flexible cords used in highly conductive work locations, such as those with water or other conductive liquids, or in places where employees are likely to contact water or conductive liquids, must be approved for those locations.
- Employee's hands must be dry when plugging and unplugging flexible cords and cord-and-plug connected equipment if energized equipment is involved.
- If the connection could provide a conducting path to employees hands (for example, if a cord connector is wet from being immersed in water), the energized plug and receptacle connections must be handled only with insulating protective equipment.
- Locking-type connectors must be properly locked into the connector.
- Lamps for general illumination must be protected from breakage, and metal shell sockets must be grounded.
- Temporary lights must not be suspended by their cords unless they have been designed for this purpose.
- Portable lighting used in wet or conductive locations, such as tanks or boilers, must be operated at no more than 12 volts or must be protected by GFCI's.
- Extension cords are considered to be temporary wiring, and must also comply with the section on "Requirements for Temporary Wiring" in this program.
- Extension cords are to be properly maintained with no exposed live parts, exposed ungrounded metal parts, damage, or splices.
- Extension cords must be made of a heavy-duty or extra-heavy-duty rated cable and must be a continuous length
- At all construction sites, in damp areas, or in an area where a person may be in direct contact with a solidly grounded conductive object, extension cords must be protected by a ground fault circuit interrupter (GFCI). The GFCI may consist of a special circuit breaker, a GFCI outlet, or an extension cord with a built-in GFCI.
 - See Thompson Electric's Assured Equipment Grounding Policy for additional guidelines.)

- Extension cords must be of sufficient current-carrying capacity to power the device for which it is intended.
 - An undersized cord presents a fire hazard.
- Extension cords must be three-conductor (grounded) – even if the device has a two-conductor cord.
 - Thompson Electric strictly prohibits the use of two-conductor extension cords.
 - Equipment grounding conductors that are part of flexible cords or used with fixture wires shall not be smaller than 18 AWG copper and not smaller than the circuit conductors.

Ground Fault Circuit Interrupter (GFCI)

- Ground fault circuit interrupters are designed to protect from electric shock when they simultaneously contact a “live”(usually a 120 volt) wire or part and a grounded object. The GFCI works by sensing a difference between the supply (hot) and return (neutral) currents. When the difference exceeds 5 mA – indicating that current is flowing to ground(through the person) – the device switches off.
- Although the GFCI is an effective safety device, it is not a guarantee against shock in every situation. The GFCI does not protect against line-to-neutral or a line-to-line shock. If GFCI-protected equipment contains transformers, a ground fault(shock) on the secondary side of the transformer may not trip the GFCI.
- GFCI testing requirements are divided into three types:
 1. Local test button-tested before each use.
 2. Remote test button-(GFCI circuit breaker, GFCI outlets protecting downstream outlets), tested monthly.
 3. GFCI outlets in continuous use-(outlets used to power small appliances located within six feet of a sink), tested monthly
- GFCI must be labeled “GFCI Protected: Test Monthly”
- Verify that testing of GFCI will not adversely affect other activities

Requirements for Temporary Wiring

Temporary electrical power and lighting installations 600 volts or less, including flexible cords, cables and extension cords, may only be used during and for renovation, maintenance, repair, or experimental work. The duration for temporary wiring used for decorative lighting for special events and similar purposes may not exceed 90 days. The following additional requirements apply:

- Ground-fault protection (i.e., ground-fault circuit interrupters, or GFCI) must be provided on all temporary-wiring circuits, including extension cords, used on construction sites.
- In general, all equipment and tools connected by cord and plug must be grounded. Listed or labeled double insulated tools and appliances need not be grounded.
- Feeders must originate in an approved distribution center, such as a panel board, that is rated for the voltages and currents the system is expected to carry.
- Branch circuits must originate in an approved power outlet or panel board.
- Neither bare conductors nor earth returns may be used for the wiring of any temporary circuit.
- Receptacles must be of the grounding type. Unless installed in a complete metallic raceway, each branch circuit must contain a separate equipment-grounding conductor, and all receptacles must be electrically connected to the grounding conductor.

- Flexible cords and cables must be of an approved type and suitable for the location and intended use. They may only be used for pendants, wiring of fixtures, connection of portable lamps or appliances, elevators, hoists, connection of stationary equipment where frequently interchanged, prevention of transmission of noise or vibration, data processing cables, or where needed to permit maintenance or repair. They may not be used as a substitute for the fixed wiring, where run through holes in walls, ceilings or floors, where run through doorways, windows or similar openings, where attached to building surfaces, or where concealed behind building walls, ceilings or floors.
- Suitable disconnecting switches or plug connects must be installed to permit the disconnection of all ungrounded conductors of each temporary circuit.
- Lamps for general illumination must be protected from accidental contact or damage, either by elevating the fixture or by providing a suitable guard. Hand lamps supplied by flexible cord must be equipped with a handle of molded composition or other approved material and must be equipped with a substantial bulb guard.

Wet or Damp Locations

Work in *wet* or damp work locations (i.e., areas surrounded or near water or other liquids) should not be performed unless it is absolutely critical. Electrical work should be postponed until the liquid can be cleaned up. The following special precautions must be incorporated while performing work in damp locations:

- Only use electrical cords that have Ground Fault Circuit Interrupters (GFCI's).
- Place a dry barrier over any wet or damp work surface.
- Remove standing water before beginning work.
- Work is prohibited in areas where there is standing water.
- Do not use electrical extension cords in wet or damp locations.
- Keep electrical cords away from standing water.

Safe Electrical Work Practices

Premises Wiring

Work on premises wiring shall be performed only by ***Qualified*** Thompson Electric or subcontractor electricians. For this section 600 volts means 600 volts rms. Inspection and testing activities shall include:

- Measuring voltage and currents with proper equipment.
- Verifying de-energized electrical circuits.
- Tracing circuits.
- Troubleshooting defective circuits or components.
- Assessing hazards in the equipment by inspection.

All test, measurement, and inspection activities for energized premises wiring and equipment operating at less than 600 volts and all de-energized electrical circuit verifications are allowed with a supervisor approved Energized Electrical Work Plan (EEEWP). If the particular activity or situation has been deemed by the responsible supervisor or Safety Manager/Coordinator to present a significant hazard, additional approvals may be required as listed below. EEEWP's for routine, repetitive, processes can be obtained through this procedure.

Due to the greater potential energies available in premises wiring, all inspection and testing work on premises wiring at 600 volts or greater, including racking of breakers, activities in situations deemed to present a significant hazard are allowed with an EEEWP approved by the Supervisor or Safety Manager/Coordinator and by the President.

For all other activities on exposed energized utilization equipment, the following additional requirements apply:

- This electrical work presenting a significant hazard and shall be allowed only under extraordinary circumstances. This scope of work shall be justified (convenience shall not be a justification), and shall require approval of the Safety Manager/Coordinator and the President.
- For each such justified circumstance an EEEWP is required.

Electrical Two-Person Rule

At least two Qualified Employees shall be present when work is being performed within the restricted approach boundary (as defined in NFPA 70E) or on exposed energized parts that meet these conditions:

- AC circuits 600 volts and above.
- DC circuits meeting all three of the following conditions:
 - 50 volts and above.
 - Fault currents of five milliamperes and above for one second or more.
 - 20 kilojoules of stored energy and above.

Working on De-Energized Equipment

Electrically Safe Condition

The most important principle of electrical safety is to **assume all electric circuits are energized unless each involved worker ensures they are not.** Every circuit and conductor must be tested every time work is done on them. Proper PPE must be worn until the equipment is proven to be de-energized.

- Voltage rated gloves and leather protectors must be worn
- Electrically insulated shoes should be worn
- Approved insulating mats
- Safety glasses must be worn
- The required Arc Flash PPE must also be worn

The National Fire Protection Association (NFPA) lists six steps to ensure conditions for electrically safe work.

1. Identify all sources of power to the equipment. Check applicable up-to-date drawings, diagrams, and identification tags.
2. Remove the load current, and then open the disconnecting devices for each power source.
3. Where possible, visually verify that blades of disconnecting devices are fully open or that draw-out type circuit breakers are fully withdrawn.
4. Apply lockout/tagout devices in accordance with a formal, written policy.
5. Test each phase conductor or circuit part with an adequately rated voltage detector to verify that the equipment is de-energized. Test each phase conductor or circuit part both phase-to-phase and phase-to-ground. Check the voltage detector before and after each test to be sure it is working.
6. Properly ground all possible sources of induced voltage and stored electric energy (such as, capacitors) before touching. If conductors or circuit parts that are being de-energized could contact

other exposed conductors or circuit parts, apply ground-connecting devices rated for the available fault current.

- **The process of de-energizing is "live" work and can result in an arc flash** due to equipment failure. When de-energizing, follow the procedures described in "Working On or Near Live Equipment."

Electrical Work Plan and Work Approvals

De-Energize Whenever Possible. While the preferred mode of work at Thompson Electric requires de-energizing electrical circuits, it is recognized that different customers and work-sites may require Qualified personnel to open energized panel boards and equipment housings.

Electrically Safe Condition

Assume all electrical circuits are energized unless each involved Qualified Employee ensures they are not. Every circuit and conductor must be tested every time work is performed on them. Proper PPE must be worn until the equipment is proven to be de-energized.

- Voltage rated gloves and leather protectors must be worn.
- Electrically insulated shoes should be worn.
- Approved insulating mats.
- Safety glasses.
- The required Arc Flash PPE must also be worn.

The National Fire Protection Agency (NFPA) lists six steps to ensure conditions for electrically safe work:

1. Identify all sources of power to the equipment. Check applicable up-to-date drawings, diagrams, and identification tags.
2. Remove the load current, and then open the disconnecting devices for each power source.
3. Where possible, visually verify that blades of disconnecting devices are fully open or that draw out-type circuit breakers are fully withdrawn.
4. Apply lockout/tagout devices in accordance with Thompson Electric's established policy and related procedures.
5. Test each phase conductor or circuit part with an adequately rated voltage detector to verify that the equipment is de-energized. Test each phase conductor or circuit part both phase-to-phase and phase-to-ground. Check the voltage detector before and after each test to be sure it is functioning properly.
6. Properly ground all possible sources of induced voltage and stored electric energy (i.e., capacitors) before touching. If conductors of circuit parts that are being de-energized could contact other exposed conductors or circuit parts, apply ground-connecting devices rated for the available fault current.
 - The process of de-energizing is 'Live' work and can result in an arc flash due to equipment failure. When de-energizing, follow the procedures outlined in "Working On or Near Live Equipment".

Electrical Work Plan

An EEWP is required for all energized electrical work activities. The purpose of the EEWP is to document that appropriate work practices and personal protective equipment are being utilized. The scope from specific equipment to routine activities and necessary approvals for EEWP's vary depending on the hazard, as described below.

The supervisor of the individual(s) performing the work is responsible for ensuring the EEWP is complete and accurate. Note that the EEWP may be incorporated into other work planning documents such as the Job Hazard Analysis, equipment lockout procedure, or other maintenance and servicing procedures.

The EEWP shall (at a minimum):

- Describe the work to be done along with a specific list of the hazards associated with the work.
- Detail how each hazard will be mitigated, for example identifying:
 - Specific voltages and currents.
 - Specific Personal Protective Equipment (PPE) requirements.
 - All other associated safety issues (i.e., fall protection).
 - Lock and tag requirements.
- Detail Safety Related Work Practices to be employed when working within the Limited Approach Boundary, for example identifying:
 - Pre-Job Analysis
 - List of possible unanticipated events and their immediate response.
 - Pre-Job meeting outlining that in these cases Thompson Electric considers all parts live until a Qualified Person, under the control of an approved and signed (see below), PJA proves otherwise, applicable permits (i.e., hot work, safe work permit, Energized Electrical Work Permit & Plan

Required Approvals

The EEWP shall be approved by the supervisor of the individual(s) performing the work. A member of Management may also require their own approval. To ensure adequate review the person approving shall not be the same as the originator. Additional approval by the Designated Safety Representative or Senior Management may be required for certain electrical work

- It is recognized that certain special or emergency instances may arise where obtaining an approved, written EEWP is neither practical nor possible. In such instances, work may proceed provided the designated approvers are consulted and assent to the work and an EEWP is generated and approved at the earliest reasonable opportunity.
- **Routine Activities.** The EEWP may cover certain routine activities for an extended period of time, but shall be reviewed at a minimum annually.
- **Distribution.** An approved EEWP is required prior to starting work. After the EEWP is approved the original shall be kept on file at the worksite, a copy shall be sent to the Safety Manager/Coordinator.
- An approved Energized Electrical Work Request and EEW are required for all work where the work includes assembly, disassembly, or re-arrangement of components while they are energized. Work below 50 volts, as well as testing, troubleshooting, and voltage measuring, are exempt from the required permit per NFPA 70E, Article 130.1(A)(3), provided that adequate work practices and personal protective equipment are used.

Post Required Approvals – Prior to Job Implementation

- After receiving approval as outlined above the supervisor or designated job site safety representative shall hold a mandatory briefing for all employees involved (i.e., regardless of status) covering at a minimum the EEWP/Job Hazard Analysis which will contain the following:
 - Specific hazards associated with the scope of work.
 - Work procedures to be followed.
 - Special precautions.
 - Energy source controls.
 - Personal Protective Equipment (PPE) requirements.
 - Length of the EEWP (time frame covered)
 - Immediate shut down if the EEWP is violated or you encounter a situation not clearly outlined on the EEWP.

Lockout/Tagout Program

Different customers or work sites may have established written lockout/tagout policies and procedures in place. Likewise Thompson Electric has established and adheres to a Hazardous Energy Control Policy. When reviewing a customer's Lockout/Tagout program supervision or the Designated Site Safety Representative shall establish that the program (at a minimum) sets guidelines for:

- Locating and labeling energy sources
- Identifying employees at risk
- How and by whom the equipment is de-energized
- Releasing of stored energy
- Verifying that the circuit is de-energized and can't be restarted
- Voltage testing
- Grounding requirements
- Shift changes
- Coordination with other jobs in progress
- A procedure for keeping track of all involved personnel
- Applying and removing lockout/tagout devices
- Return to service
- Temporary re-energizing for testing/positioning.

Lockout/Tagout procedures shall be in place and readily available for each machine or piece of equipment that will require servicing.

- Each Authorized Worker installs his/her lock(s) and danger tag(s) during the Authorized Worker Lockout/Tagout process before starting work and removes them when leaving that work assignment. The personal "Lockout" and "Danger Tag" signifies that an Authorized Worker is working on a component.
- The Authorized Worker's "Danger Tag" is for the exclusive use of the Authorized Worker identified (use permanent ink) on that Danger Tag.
- No one shall authorize another person to ignore or violate this program. No one shall operate any device on which a Lockout/Tagout device is installed.
- No one shall remove a Lockout device when an unsafe condition exists until that condition has been made safe or another Lockout device has been installed.
- No Authorized Worker shall install a Lockout/Tagout on any system without notifying the controlling organization, unless the work control system specifically addresses this issue. This is to ensure the controlling organization knows the status of its equipment/systems.

- Only keyed locks are authorized for Lockout.
- The Authorized Worker maintains control of the key(s) for any lock(s) he/she applies. If a backup key exists, it is locked in a safe location away from the work site and controlled by the Authorized Worker's foreman to be used only in extreme circumstances.
- Locks and tags can only be removed by the Authorized Worker who originally installed them. When this Authorized Worker is not on site, the device(s) may be removed under the direction of the Authorized Worker's management after all reasonable efforts to reach the worker have been taken. A "Notification of Lock Removal" form must be completed and given to the original Authorized Worker whenever this procedure is performed.
 - NOTE: *A phone conversation with the original Authorized Worker is considered adequate when documented. If contact with the original Authorized Worker was not possible, he/she must be informed of the Lockout/Tagout removal upon returning to work.*
- Each employer [contractor(s) and/or sub-contractor(s)] shall supply all locks and associated hardware to be used by their Authorized Workers at no cost to the Authorized Worker. The locks may be issued on a permanent basis or on an as needed basis.
- If an isolating device has the physical capability of being locked out, it shall be locked out and a danger tag installed with each lock. If the isolating device cannot be physically locked out, it shall be tagged out.
 - When a lock cannot be applied along with a danger tag, the tagout devices, including their means of attachment, must be durable and substantial enough to prevent inadvertent or accidental removal. Tagout attachment devices shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of not less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one piece, all-environment-tolerant nylon cable tie.
- If an isolating device cannot be locked, then protective equivalent to that provided by locks must be established, and danger tag(s) used to ensure the equivalent protection is maintained.
 - Examples of measures that could be used to provide protection equivalent to locks and prevent a system from being energized include removing an isolating circuit element or fuse, blocking switch controls, opening extra circuit disconnects, and removing valve handles.
- Install tags so that they do not interfere with or obscure indications, switches, or other control devices.
- Do not remove pieces of equipment with attached locks or tags from their installed location. If a locked/tagged component must be removed (i.e., during demolition, replacement, or rework), then, reset or readjust the isolation boundaries so that any locks and tags may be properly cleared from the component that is to be removed.
- When danger tag(s) used in a hazardous chemical control zone cannot be released, destroy or deface them to prevent reuse and dispose of in accordance with appropriate disposal procedures.

Equipment

Vehicular & Mechanical

- When work must be performed near overhead lines, the lines shall be de-energized and grounded, or other protective measures shall be provided prior to the commencement of any work activity.
 - If the lines are to be de-energized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to de-energize and ground them.
 - If protective measures, such as guarding, isolating or insulating are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools or equipment.

Elevated Equipment

- Where any vehicle or mechanical equipment structure will be elevated near energized overhead lines, they shall be operated so that the Limited Approach Boundary distance of NFPA table 130.2(C), column 2, is maintained. However, under any of the following conditions, the clearances shall be permitted to be reduced:
 - If the vehicle is in transit with its structure lowered, the Limited Approach Boundary distance to the overhead lines in NFPA Table 130.2 (C), column 2, shall be permitted to be reduced by 6 ft. If insulated barriers, rated for the voltages involved, are installed and they are not part of an attachment to the vehicle, the clearance shall be permitted to be reduced to the design working dimensions of the insulating barrier.
 - If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person, the clearance (between the un-insulated portion of the aerial lift and the power line) shall be permitted to be reduced to the Restricted Approach Boundary given in NFPA Table 130.2 (C), column 4.

Equipment Contact

- Employees standing on the ground shall not contact the vehicle or mechanical equipment or any of its attachments, unless either of the following conditions applies:
 - The employee is using protective equipment rated for the voltage.
 - The equipment is located so that no un-insulated part of the structure (that portion of the structure that provide a conductive path to employees on the ground) can come closer to the line than permitted in NFPA 130.5 (E)(1).

Equipment Grounding

- If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding shall not stand at the grounding location whenever there is a possibility of overhead line contact.
 - Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials (step and touch potential), which can develop within a few feet or more outward from the ground point.

Working On or Near Energized Equipment

Working on live circuits means actually touching energized parts. Working near live circuits means working close enough to energized parts to pose a risk even though work is on de-energized parts. Common tasks where there may be a need to work on or near live circuits include:

- Taking voltage measurements
- Opening and closing disconnects and breakers
- Racking breakers on and off the bus
- Removing panels and dead fronts
- Opening electric equipment doors for inspection

Facilities should adopt standard written procedures and training for these common tasks. For instance, when opening and closing disconnects, use the **left-hand rule** when possible.

- Stand to the right side of the equipment and operate the disconnect switch with the left hand.

Energized Electrical Work Permit for 240 volts and Higher

If live parts are not placed in an electrically safe condition, work to be performed shall be considered energized electrical work and shall be performed by **written permit only**.

A copy of the Energized Electrical Work Permit (EERP) can be found in the Appendix A of this document. The intent of this permit is to ensure that all appropriate safety precautions are taken prior to starting energized electrical work.

- *Work related to testing, troubleshooting, and voltage measuring may be completed without a permit provided appropriate safe work practices and PPE are used.*
- The permit must be originated by the Qualified electrical worker.
- Energized Work Permits shall be submitted to the appropriate supervisor for each facility.
- The permit must be posted in an appropriate location where the energized work is taking place for the duration of the task.
- Energized electrical work permits must be kept on file by the supervisor for auditing and recordkeeping purposes upon completion of the task.

Approach Distances to Exposed Live Parts

The National Fire Protection Association (NFPA) defines 3 approach distances for shock hazards and one for arc flash.

- The **limited approach boundary** is the distance from an exposed live part within which a shock hazard exists.
- The **restricted approach boundary** is the closest distance to exposed live parts a qualified person can approach with without proper PPE and tools. Inside this boundary, accidental movement can put a part of the body or conductive tools in contact with live parts or inside the prohibited approach boundary. To cross the restricted approach boundary, the qualified person must:
 - Have an energized work permit that is approved by the supervisor or manager responsible or the safety plan.
 - Use PPE suitable for working near exposed live parts and rated for the voltage and energy level involved.

- Be certain that no part of the body enters the prohibited space.
 - Minimize the risk from unintended movement, by keeping as much of the body as possible out of the restricted space; body parts in the restricted space should be protected.
- The **prohibited approach boundary** is the minimum approach distance to exposed live parts to prevent flashover or arcing. Approaching any closer is comparable to making direct contact with a live part. To cross the prohibited approach boundary, the qualified person must:
- Have specified training to work on exposed live parts.
 - Have a permit with proper written work procedures and justifying the need to work that close.
 - Do a risk analysis.
 - Have (2) and (3) approved by the appropriate supervisor.
 - Use PPE appropriate for working near exposed live parts and rated for the voltage and energy level involved.
- In reference to Arc Flash the **Flash Protection Boundary** is the approach limit at a distance from exposed live parts within which a person could receive a second degree burn if an electrical arc flash were to occur.
- Use PPE appropriate for working near exposed live parts and rated for the voltage and energy level involved.
 - For systems of 600 volts and less, the flash protection boundary is 4 feet, based on an available bolted fault current of 50 kA and a clearing time of 6 cycles for the circuit breaker to act, or any combination of fault currents and clearing times not exceeding 300 kA cycles.
 - When working on de-energized parts and inside the flash protection boundary for nearby live exposed parts:
 - If the parts cannot be de-energized, use barriers such as insulated blankets to protect against accidental contact or wear proper PPE.

Other Precautions for Personnel Activities

- When working on de-energized the parts, but still inside the flash protection boundary for nearby live exposed parts:
- If the parts cannot be de-energized, barriers such as insulated blankets must be used to protect against accidental contact or PPE must be worn.
 - Employees shall not reach blindly into areas that might contain exposed live parts.
 - Employees shall not enter spaces containing live parts unless illumination is provided that allows the work to be performed safely.
 - Conductive articles of jewelry and clothing (such as watchbands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, metal headgear, or metal frame glasses) shall not be worn where they present an electrical contact hazard with exposed live parts.
 - Conductive materials, tools, and equipment that are in contact with any part of an employee's body shall be handled in a manner that prevents accidental contact with live parts. Such materials and equipment include, but are not limited to long conductive objects such as ducts, pipes, tubes, conductive hose and rope, metal-lined rules and scales, steel tapes, pulling lines, metal scaffold parts, structural members, and chains.

- When an employee works in a confined space or enclosed spaces (such as a manhole or vault) that contains exposed live parts, the employee shall use protective shields, barriers or insulating materials as necessary to avoid contact with these parts. Doors, hinged panels, and the like shall be secured to prevent them from swinging into employees. Refer to the confined space entry program.
- Employees shall not enter spaces containing electrical hazards unless illumination is provided that enables the employees to perform the work safely. Where lack of illumination or an obstruction precludes observation of the work to be performed, employees shall not perform any task within the Limited Approach Boundary or energized electrical conductors or circuit parts operating at 50 volts or more or where an electrical hazard exists.

Job Briefing

A job briefing or Task Hazard Analysis (example included in this policy on pages 45 to page 49) shall be completed prior to the beginning of any work with any and all involved employees, sub-contractor employees, customer representatives affected by our work scope and will include at a minimum the following:

- Hazards associated with the job
- Specific work procedures to be followed
- Special precautions
- Energy source controls
- Personal Protective Equipment requirements
- Information on the Energized Electrical Work Permit (if applicable)

Additional updates and job briefings shall be held with all involved parties (regardless of status) if changes that might affect the safety of employees occur during the course of the work.



Appendix A - Energized Electrical Work Permit & Work Plan

- Permit is valid for one working shift unless otherwise noted in writing by the Manager Authorizing Work in Section 6 & reflected in "End Time/Date" section. (EEWP is not to exceed 1 year from start date) EEWP is to be completed, authorized and used as JHA for all procedures in the limited approach boundary regardless of scope.

Part 1: Project Information

Date:	Start Time:	End Time/Date:
Job Location:		
Description of Circuit & Equipment including applicable serial or equipment inventory number:		

Part 2: Hazard Analysis (check all that apply)

Safe Access To Worksite

- ☐ Ladder ☐ Scaffolding ☐ Roof ☐ Sewer ☐ Catwalk or Landing ☐ Pit or Tunnel ☐ Suspended Ceiling

Potential Hazards and Safeguards

- ☐ Asbestos ☐ Biological Hazards ☐ Chemicals ☐ Compressed Gas ☐ Heat or Cold Stress
- ☐ Electrical Powerline Overhead ☐ Electrical: Damp/wet Environment ☐ Confined Space or Permit Required Confined Space
- ☐ Energized Equipment ☐ Mechanical ☐ Hydraulic ☐ Pneumatic ☐ Steam
- ☐ Fire Hazard ☐ Lead ☐ Noise ☐ Fall Hazards (work plan may be required)
- ☐ Excavation, Trenching, Shoring ☐ Materials Handling (forklift, lift, hoist, etc.) ☐ Overhead Hazard

Personal Protective Equipment

- ☐ Ears ☐ Eyes ☐ Feet ☐ Hands ☐ Head ☐ Respiratory
- ☐ Radiation (list): ☐ Welding/Cutting (list):

Electrical Energy Source Hazards For This Permit – Check all that apply

- ☐ 120 volts ☐ 277 volts ☐ DC ☐ Emergency Power
- ☐ 208 volts ☐ 480 volts ☐ Less than 50 volts (permit may not be required)
- ☐ Other (describe):

Work to be performed & work practices to be used:

Justification for Energized Work

- ☐ **Exemption 1** – De-Energizing introduces additional or increased hazards. Examples include interruption of life support equipment, deactivation of emergency alarm systems, shutdown of hazardous location ventilation equipment or removal of illumination for an area.
- ☐ **Exemption 2** – De-energizing is infeasible due to equipment design or operation limitations. Examples include testing of electrical circuits that can only be performed with the circuit energized, and work on circuits that form an integral part of a continuous industrial process in a chemical plant that would otherwise need to be completely shut down in order to permit work on one circuit or piece of equipment.
- ☐ **Exemption 3** – Live parts that operate at less than 50V to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs.

Explain specifics for this work:

Special Instructions:

Approach Boundaries to Live Parts for Shock Protections (NFPA 70E, Table 130.2 (C))				
	System Voltage	Limited Approach (fixed circuit parts) Boundary	Restricted Approach Boundary	Prohibited Approach Boundary
☐	Less than 50V	Not Specified	Not Specified	Not Specified
☐	50V to 300V	3' 6"*	Avoid Contact	Avoid Contact
☐	301V to 750V	3' 6"*	1' 0"	0' 1"
☐	751V to 15kV	5' 0"*	2' 2"	0' 7"
☐	5.1kV to 35kV	6' 0"	2' 7"	0' 10"
☐	36.1kV to 46kV	8' 0"	2' 9"	1' 5"
☐	46.1kV to 72.5kV	8' 0"*	3' 2"	2' 1"
☐	72.6kV to 121kV	8' 0"***	3' 3"	2' 8"
☐	138kV to 145kV	10' 0"***	3' 7"	3' 1"
* If any conductors are moveable, the limited approach distance is 10" ** If any conductors are movable, the limited approach distance is 10' 8" *** If any conductors are moveable, the limited approach distance is 11' 0"				
Flash Hazard Analysis (NFPA 70E.130.3[A]) ➤ Contact Senior Management to complete this section if work does not meet the less than 600V or .1 sec. clearing time. ➤ The person completing this section must complete the Authorization (Section 6). Flash Protection Boundary (check method used to determine boundary) ☐ 4' 0" (systems less than 600 volts, with 0.1 second clearing time; lbf<50kA, or 5000 A-sec) ☐ Other (please state the source or attach the work performed to derive the boundary).				
Fault Clearing Device (name):			Description:	
Manufacturer/Model/Type:				
Clearing time, seconds:				
Hazard Risk Level Determination Method Used: ☐ Available short circuit fault current is less than 10,000 amps. ▪ Identify source of calculated value: _____ ☐ From NFPA 70E Table 130.7(C)(9)(A) ☐ Other (describe): _____				
Hazard/Risk Level ☐ -1 ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 At a distance of: _____				

Part 3: Personal & Other Protective Equipment

Use NFPA 70E Table 130.7(C)(10) and check all that apply:

			CAL Rating		CAL Rating
☐	Pants	☐	FR Long Sleeve Shirt	☐	FR Flash Suit Pants
☐	Natural Fiber Clothing	☐	FR Pants	☐	FR Hard Hat
☐	Eye Protection	☐	FR Coverall	☐	FR Safety Goggles
☐	T-Shirt (short sleeve)	☐	FR Jacket	☐	Arc-Rated Face Shield
☐	Long Sleeve Shirt	☐	FR Flash Suit Jacket	☐	Flash Suit Hood
☐	Hearing Protection	☐	Leather Gloves	☐	Protective Footwear

No jewelry or metal objects can be worn or carried in pockets while completing work requiring an energized work permit

Other Protective Equipment:

Insulated tools and equipment required per NFPA 70E Table 130.7(C)(9)(A)

☐	Insulated Tools	☐	Portable Ladders	☐	Rubber Insulating Equipment
☐	Fuse or Fuse Holding Equipment	☐	Fiberglass-Reinforced Plastic Rods	☐	Voltage Rated Plastic Guard Equipment
☐	Ropes and Hand Lines	☐	Protective Shields	☐	Physical or Mechanical Barriers

Part 4: Site Control & Support**Worksite Control:**

- ☐ Locked Access ☐ Barrier Tapes, Stanchions ☐ Other:
☐ Electrical Hazard Signs ☐ Attendant

Worker Support Required:

- ☐ Safety Watch Required

Means of emergency communication (check all that apply):

- ☐ Radio ☐ Cell Phone ☐ Phone

Part 5: Personnel

Signatures are not required until the work briefing is complete

Qualified Person:

- ☐ Performing Work ☐ Safety Watch
 Reviewed Hazard Analysis ☐ Yes ☐ No
 Completed Job Briefing ☐ Yes ☐ No
 Agrees to Requirements ☐ Yes ☐ No

Name (print legibly):

Signature:

Date:

NOTE: If any unexpected energy is found, or equipment has been modified since the permit was issued, the permit is VOID.

Date:

(9) Selection of Personal Protective Equipment.

(a) When Required for Various Tasks. When selected in lieu of the flash hazard analysis of 130.3(A), Table 130.7(C)(9)(a) shall be used to determine the hazard/risk category for a task. The assumed short-circuit current capacities and fault clearing times for various tasks are listed in the text and notes to Table 130.7(C)(9)(a). For tasks not listed, or for power systems with greater than the assumed short-circuit current capacity or with longer than the assumed fault clearing times, a flash hazard analysis shall be required in accordance with 130.3.

FPN No. 1: Both larger and smaller available short-circuit currents could result in higher available arc-flash energies. If the available short-circuit current increases without a decrease in the opening time of the overcurrent protective device, the arc-flash energy will increase. If the available short-circuit current decreases, resulting in a longer opening time for the overcurrent protective device, arc-flash energies could also increase.

FPN No. 2: Energized parts that operate at less than 50 volts are not required to be de-energized to satisfy an "electrically safe work condition." Consideration should be given to the capacity of the source, any overcurrent protection between the energy source and the worker, and whether the work task related to the source operating at less than 50 volts increases exposure to electrical burns or to explosion from an electric arc.

Table 130.7(C)(9)(a) Hazard/Risk Category Classifications

Task (Assumes Equipment Is Energized, and Work Is Done Within the Flash Protection Boundary)	Hazard/ Risk Category	V-rated Gloves	V-rated Tools
Panelboards Rated 240 V and Below — Notes 1 and 3			
Circuit breaker (CB) or fused switch operation with covers on	0	N	N
CB or fused switch operation with covers off	0	N	N
Work on energized parts, including voltage testing	1	Y	Y
Remove/install CBs or fused switches	1	Y	Y
Removal of bolted covers (to expose bare, energized parts)	1	N	N
Opening hinged covers (to expose bare, energized parts)	0	N	N
Panelboards or Switchboards Rated >240 V and up to 600 V (with molded case or insulated case circuit breakers) — Notes 1 and 3			
CB or fused switch operation with covers on	0	N	N
CB or fused switch operation with covers off	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
600 V Class Motor Control Centers (MCCs) — Notes 2 (except as indicated) and 3			
CB or fused switch or starter operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch or starter operation with enclosure doors open	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	2*	Y	Y
Insertion or removal of individual starter "buckets" from MCC — Note 4	3	Y	N
Application of safety grounds, after voltage test	2*	Y	N
Removal of bolted covers (to expose bare, energized parts)	2*	N	N
Opening hinged covers (to expose bare, energized parts)	1	N	N

Table 130.7(C)(9)(a) *Continued*

Task (Assumes Equipment Is Energized, and Work Is Done Within the Flash Protection Boundary)	Hazard/ Risk Category	V-rated Gloves	V-rated Tools
600 V Class Switchgear (with power circuit breakers or fused switches) — Notes 5 and 6			
CB or fused switch operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch operation with enclosure doors open	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	2*	Y	Y
Insertion or removal (racking) of CBs from cubicles, doors open	3	N	N
Insertion or removal (racking) of CBs from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	2*	Y	N
Removal of bolted covers (to expose bare, energized parts)	3	N	N
Opening hinged covers (to expose bare, energized parts)	2	N	N
Other 600 V Class (277 V through 600 V, nominal) Equipment — Note 3			
Lighting or small power transformers (600 V, maximum)	—	—	—
Removal of bolted covers (to expose bare, energized parts)	2*	N	N
Opening hinged covers (to expose bare, energized parts)	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Application of safety grounds, after voltage test	2*	Y	N
Revenue meters (kW-hour, at primary voltage and current)	—	—	—
Insertion or removal	2*	Y	N
Cable trough or tray cover removal or installation	1	N	N
Miscellaneous equipment cover removal or installation	1	N	N
Work on energized parts, including voltage testing	2*	Y	Y
Application of safety grounds, after voltage test	2*	Y	N
NEMA E2 (fused contactor) Motor Starters, 2.3 kV Through 7.2 kV			
Contactor operation with enclosure doors closed	0	N	N
Reading a panel meter while operating a meter switch	0	N	N
Contactor operation with enclosure doors open	2*	N	N
Work on energized parts, including voltage testing	3	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	0	Y	Y
Work on control circuits with energized parts >120 V, exposed	3	Y	Y
Insertion or removal (racking) of starters from cubicles, doors open	3	N	N
Insertion or removal (racking) of starters from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	3	Y	N
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N

Table 130.7(C)(9)(a) *Continued*

Task (Assumes Equipment Is Energized, and Work Is Done Within the Flash Protection Boundary)	Hazard/ Risk Category	V-rated Gloves	V-rated Tools
Metal Clad Switchgear, 1 kV and Above			
CB or fused switch operation with enclosure doors closed	2	N	N
Reading a panel meter while operating a meter switch	0	N	N
CB or fused switch operation with enclosure doors open	4	N	N
Work on energized parts, including voltage testing	4	Y	Y
Work on control circuits with energized parts 120 V or below, exposed	2	Y	Y
Work on control circuits with energized parts >120 V, exposed	4	Y	Y
Insertion or removal (racking) of CBs from cubicles, doors open	4	N	N
Insertion or removal (racking) of CBs from cubicles, doors closed	2	N	N
Application of safety grounds, after voltage test	4	Y	N
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N
Opening voltage transformer or control power transformer compartments	4	N	N
Other Equipment 1 kV and Above			
Metal clad load interrupter switches, fused or unfused	—	—	—
Switch operation, doors closed	2	N	N
Work on energized parts, including voltage testing	4	Y	Y
Removal of bolted covers (to expose bare, energized parts)	4	N	N
Opening hinged covers (to expose bare, energized parts)	3	N	N
Outdoor disconnect switch operation (hookstick operated)	3	Y	Y
Outdoor disconnect switch operation (gang-operated, from grade)	2	N	N
Insulated cable examination, in manhole or other confined space	4	Y	N
Insulated cable examination, in open area	2	Y	N

Note:

V-rated Gloves are gloves rated and tested for the maximum line-to-line voltage upon which work will be done.

V-rated Tools are tools rated and tested for the maximum line-to-line voltage upon which work will be done. 2* means that a double-layer switching hood and hearing protection are required for this task in addition to the other Hazard/Risk Category 2 requirements of Table 130.7(C)(10).

Y = yes (required)

N = no (not required)

Notes:

1. 25 kA short circuit current available, 0.03 second (2 cycle) fault clearing time.
2. 65 kA short circuit current available, 0.03 second (2 cycle) fault clearing time.
3. For < 10 kA short circuit current available, the hazard/risk category required may be reduced by one number.
4. 65 kA short circuit current available, 0.33 second (20 cycle) fault clearing time.
5. 65 kA short circuit current available, up to 1.0 second (60 cycle) fault clearing time.
6. For < 25 kA short circuit current available, the hazard/risk category required may be reduced by one number.

(10) Protective Clothing and Personal Protective Equipment Matrix. Once the Hazard/Risk Category has been identified, Table 130.7(C)(10) shall be used to determine the required personal protective equipment (PPE) for the task. Table 130.7(C)(10) lists the requirements for protective clothing and other protective equipment based on Hazard/Risk Category numbers 0 through 4. This clothing and equipment shall be used when working on or near energized equipment within the Flash Protection Boundary.

FPN No. 1: See Annex H for a suggested simplified approach to ensure adequate PPE for electrical workers within facilities with large and diverse electrical systems.

FPN No. 2: The PPE requirements of this section are intended to protect a person from arc-flash and shock hazards. While some situations could result in burns to the skin, even with the protection described in Table 130.7(C)(10), burn injury should be reduced and survivable. Due to the explosive effect of some arc events, physical trauma injuries could occur. The PPE requirements of this section do not provide protection against physical trauma other than exposure to the thermal effects of an arc flash.

(11) Protective Clothing Characteristics. Table 130.7(C)(11) lists examples of protective clothing systems and typical characteristics including the degree of protection for various clothing. The protective clothing selected for the corresponding hazard/risk category number shall have an arc rating of at least the value listed in the last column of Table 130.7(C)(11).

FPN: The arc rating for a particular clothing system can be obtained from the FR clothing manufacturer.

(12) Factors in Selection of Protective Clothing. Clothing and equipment that provide worker protection from shock and arc flash hazards shall be utilized. Clothing and equipment required for the degree of exposure shall be permitted to be worn alone or integrated with flammable, nonmelting apparel. If FR clothing is required, it shall cover associated parts of the body as well as all flammable apparel while allowing movement and visibility. All personal protective equipment shall be maintained in a sanitary and functionally effective condition. Personal protective equipment items will normally be used in conjunction with one another as a system to provide the appropriate level of protection.

FPN: Protective clothing includes shirts, pants, coveralls, jackets, and parkas worn routinely by workers who, under normal working conditions, are exposed to momentary electric arc and related thermal hazards. Flame-resistant rainwear worn in inclement weather is included in this category of clothing.

(a) **Layering.** Nonmelting, flammable fiber garments shall be permitted to be used as underlayers in conjunction with FR garments in a layered system for added protection. If nonmelting, flammable fiber garments are used as underlayers, the system arc rating shall be sufficient to prevent breakdown of the innermost FR layer at the expected arc exposure incident energy level to prevent ignition of flammable underlayers.

FPN: A typical layering system might include cotton underwear, a cotton shirt and trouser, and a FR coverall. Specific tasks might call for additional FR layers to achieve the required protection level.

(b) **Outer Layers.** Garments worn as outer layers over FR clothing, such as jackets or rainwear, shall also be made from FR material.

(c) **Underlayers.** Melttable fibers such as acetate, nylon, polyester, polypropylene, and spandex shall not be permitted in fabric underlayers (underwear) next to the skin.

Exception: An incidental amount of elastic used on nonmelting fabric underwear or socks shall be permitted.

FPN No. 1: FR garments (e.g., shirts, trousers, and coveralls) worn as underlayers that neither ignite nor melt and drip in the course of an exposure to electric arc and related thermal hazards generally provide a higher system arc rating than nonmelting, flammable fiber underlayers.

FPN No. 2: FR underwear or undergarments used as underlayers generally provide a higher system arc rating than nonmelting, flammable fiber underwear or undergarments used as underlayers.

(d) **Coverage.** Clothing shall cover potentially exposed areas as completely as possible. Shirt sleeves shall be fastened at the wrists, and shirts and jackets shall be closed at the neck.

(e) **Fit.** Tight-fitting clothing shall be avoided. Loose-fitting clothing provides additional thermal insulation because of air spaces. FR apparel shall fit properly such that it does not interfere with the work task.

(f) **Interference.** The garment selected shall result in the least interference with the task but still provide the necessary protection. The work method, location, and task could influence the protective equipment selected.

(13) Arc Flash Protective Equipment.

(a) **Flash Suits.** Flash suit design shall permit easy and rapid removal by the wearer. The entire flash suit, including the hood's face shield, shall have an arc rating that is suitable for the arc flash exposure. When exterior air is supplied into the hood, the air hoses and pump housing shall be either covered by FR materials or constructed of nonmelting and nonflammable materials.

(b) **Face Protection.** Face shields shall have an arc rating suitable for the arc flash exposure. Face shields without an arc rating shall not be used. Eye protection (safety glasses or goggles) shall always be worn under face shields or hoods.

FPN: Face shields made with energy-absorbing formulations that can provide higher levels of protection from the radiant energy of an arc flash are available, but these shields are tinted and can reduce visual acuity. Additional illumination of the task area might be necessary when these types of arc protective face shields are used.

Table 130.7(C)(10) Protective Clothing and Personal Protective Equipment (PPE) Matrix

Protective Clothing and Equipment	Protective Systems for Hazard/Risk Category					
Hazard/Risk Category Number	-1 (Note 3)	0	1	2	3	4
Non-melting (according to ASTM F 1506-00) or Untreated Natural Fiber						
a. T-shirt (short-sleeve)	X			X	X	X
b. Shirt (long-sleeve)		X				
c. Pants (long)	X	X	X (Note 4)	X (Note 6)	X	X
FR Clothing (Note 1)						
a. Long-sleeve shirt			X	X	X (Note 9)	X
b. Pants			X (Note 4)	X (Note 6)	X (Note 9)	X
c. Coverall			X (Note 5)	X (Note 7)	X (Note 9)	X (Note 5)
d. Jacket, parka, or rainwear			AN	AN	AN	AN
FR Protective Equipment						
a. Flash suit jacket (multilayer)						X
b. Flash suit pants (multilayer)						X
c. Head protection						
1. Hard hat			X	X	X	X
2. FR hard hat liner					AR	AR
d. Eye protection						
1. Safety glasses	X	X	X	AL	AL	AL
2. Safety goggles				AL	AL	AL
e. Face and head area protection						
1. Arc-rated face shield, or flash suit hood				X (Note 8)		
2. Flash suit hood					X	X
3. Hearing protection (ear canal inserts)				X (Note 8)	X	X
f. Hand protection						
Leather gloves (Note 2)			AN	X	X	X
g. Foot protection						
Leather work shoes			AN	X	X	X

AN = As needed

AL = Select one in group

AR = As required

X = Minimum required

Notes:

1. See Table 130.7(C)(11). Arc rating for a garment is expressed in cal/cm².

2. If voltage-rated gloves are required, the leather protectors worn external to the rubber gloves satisfy this requirement.

3. Hazard/Risk Category Number "-1" is only defined if determined by Notes 3 or 6 of Table 130.7(C)(9)(a).

4. Regular weight (minimum 12 oz/yd² fabric weight), untreated, denim cotton blue jeans are acceptable in lieu of FR pants. The FR pants used for Hazard/Risk Category 1 shall have a minimum arc rating of 4.

5. Alternate is to use FR coveralls (minimum arc rating of 4) instead of FR shirt and FR pants.

6. If the FR pants have a minimum arc rating of 8, long pants of non-melting or untreated natural fiber are not required beneath the FR pants.

7. Alternate is to use FR coveralls (minimum arc rating of 4) over non-melting or untreated natural fiber pants and T-shirt.

8. A faceshield with a minimum arc rating of 8, with wrap-around guarding to protect not only the face, but also the forehead, ears, and neck (or, alternatively, a flash suit hood), is required.

9. Alternate is to use two sets of FR coveralls (the inner with a minimum arc rating of 4 and outer coverall with a minimum arc rating of 5) over non-melting or untreated natural fiber clothing, instead of FR coveralls over FR shirt and FR pants over non-melting or untreated natural fiber clothing.

Appendix D

Rubber Insulating Equipment Test Intervals	
Type of Equipment	When To Test
Rubber Insulating Line Hose	Upon indication that insulating value is suspect.
Rubber Insulating Covers	Upon indication that insulating value is suspect.
Rubber Insulating Blankets	Before first issue and every 12 months thereafter (1).
Rubber Insulating Gloves	Before first issue and every 6 months thereafter (1).
Rubber Insulating Sleeves	Before first issue and every 12 months thereafter (1).
Footnote(1) If the insulating equipment has been electrically tested but not issued for service, it may not be placed into service unless it has been electrically tested within the previous 12 months.	

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Original issue of policy	Safety Div.	Safety Div.	01/2016	01/2016
01	- Revised Energized Electrical Work Plan and Work Permit - Clarified that all electric lines and equipment shall be considered and treated as live - Clarified that all employees working within reaching distance of exposed energized parts or equipment, shall remove all conductive articles (i.e., watches, jewelry, rings, etc.) unless it is proven such articles do not increase their hazard of contact with energized parts	Safety Div.	Safety Div.	07/2016	07/2016
02	- Clarified definition of a “Qualified Employee” - Clarified requirement of working within the MAD even on host employer work sites - Added need for proper body positioning - Added TEI Division Management designates who is a “Qualified Electrician” based on training, ranking, and experience - Added requirement to obtain heat energy calculations of existing equipment from host employer/client - Clarified that devices used to open & close circuits under load conditions are designed to interrupt or carry the current involved	Safety Div.	Safety Div.	03/2019	03/2019
03	- Clarification of Customer Specific Requirements which exceed OSHA Requirements shall be reviewed by Safety Manager with Division and/or Project Manager - Removed Class I and Class 3 Gloves from “Rubber Insulating Equipment Voltage Requirements” as these are not stocked by TEI	Safety Div.	Safety Div.	10/2019	11/2019
09/2020	Annual Review no changes	N/A	Management w/Safety	N/A	N/A



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362



Hearing Conservation Program (Noise Exposure) Requirements & Guidelines

2020 - 2021

Introduction

The term “Company” as used in Thompson Electric, Inc.’s (*herein referred to as TEI*) Hearing Conservation Program includes all employees (regardless of status), sub-contractor employees, on Thompson Electric, Inc. Work sites.

Many operations and pieces of equipment used at the TEI’s worksites produce noise. Exposure to excessive levels of noise can result in a permanent loss of hearing acuity, development of Tinnitus (i.e., ringing of the ears), a possible increase in blood pressure and stress-related problems.

This policy and procedure is applicable to all TEI employees who may be exposed to sound levels of 85 dbA or greater in the course of their duties

Policy

No TEI employee will work in an environment with noise levels above 85 decibels without appropriate engineering and administrative controls or Personal Protective Equipment (PPE) to reduce the exposure to below 85 dB. All TEI locations and worksites will comply with the requirements of this policy and the standards in 29 CFR 1910 and 1926.

Definitions

Acoustic Trauma – Refers to a temporary or permanent hearing loss due to a sudden, intense acoustic or noise event, such as an explosion.

Decibel (dB): A unit that measures the intensity or loudness of a sound.

dB(A): The intensity of sound measured on the A-weighted scale which is weighted to match how the human ear hears (i.e., doesn’t hear low frequencies very well). OSHA requires this scale to be used for measuring employee noise exposure.

Noise Control Zones – Refers to identifying a zone around a noise source such as a piece of equipment where hearing protection is required inside the zone, but not outside. The zone needs to be well marked with barricade tape and proper signage.

Noise Induced Hearing Loss – Hearing loss that is caused either by a one-time or repeated exposure to very loud sound or sounds at various loudness levels over an extended period of time.

NRR (Noise Reduction Rating) – Measure of the estimated attenuation capacity of a hearing protector to represent the approximate noise reduction, in dBA. This number is used to calculate the noise reduction provided by each different hearing protector.

Overprotection – Reducing noise level exposure to lower than necessary (i.e., below 70 dB) through the use of hearing protection. This is considered overprotection because it would make it hard to hear back up alarms and other important noises.

STS (Standard Threshold Shift) – A permanent loss in hearing sensitivity due to the destruction of sensory cells in the inner ear. It is defined as (under OSHA) an average of 10 decibels (dB) hearing shift in the 2000,3000, and 4000 hertz frequencies. This damage can be caused by “Long Term Exposure to Noise” and “Acoustic Trauma”.

TTS (Temporary Threshold Shift) – A temporary loss in hearing sensitivity due to noise exposure. Hearing sensitivity will return to the pre-exposed level in a manner of hours or days, assuming that there is not continued exposure to excessive noise.

Responsibilities

Division Management shall be responsible for the following:

- Assisting Safety with the Annual review and update of TEI's Hearing Conservation Program to conform to current CFR standards.
- Insure compliance with standards set forth in this program and policies by TEI employees and Subcontractors through periodic inspection of their work sites.
- Ensuring that stipulations and exposure limits described in this supplement are included in specifications and contract documentation for work to be performed by subcontractors.
- Provide oversight, general administration, and monitoring of the "Company's" Audiometric Contractor's performance.

Safety shall be responsible for the following:

- Working with Managers to coordinating training, with their Supervisory Personnel, to enroll employees found to be exposed to noise levels that exceed the permissible limits in TEI's Hearing Conservation Program.
- Scheduling and overseeing monitoring for suspect areas identified each divisions Supervisory Personnel, or as identified in the worksite Hazard Assessment procedure (See the "Company's" Personal Protective Equipment Policy and Procedure.)
- Conducting noise surveys to establish the noise levels at various work sites as required; and ensuring the posting of appropriate signs in specific areas, operations, or equipment that may expose employees to noise above 85 dBA.
- Working with Human Resources to notify affected employees (and their managers) within 21 days of receiving the report on their hearing tests or if the results of noise monitoring indicates the employee's routine 8 hour TWA exceeds 50% of the PEL.
- Ensure that employee audiometric test records are maintained in the employee's personnel file per the terms of this policy and procedure by Human Resources.
- Ensure that all cases where a STS occurs are recorded on the OSHA log 300 as an occupational illness.

Supervisor (Field Management) shall be responsible for the following:

- Scheduling employees for hearing tests and training if the employees are included in the Hearing Conservation Program (HCP).
 - Employees who are placed in a job where excessive noise levels (90 dBA or above) occur will be scheduled for audiometric tests within 90 days of their placement. This will include both new hires and employees transferred into high noise jobs.
- Enforcing the use of hearing protection through disciplinary action as prescribed in the "Company's" Disciplinary Program.
- Ensuring that an adequate supply and variety of hearing protection is maintained at their worksite and that employees are reminded and transported for evaluation or treatment.

Employees shall be responsible for the following:

- Complying with all applicable guidelines contained in this safety policy and procedure.
- Inform their Supervisor if a change occurs in the workplace that results in exposure to higher noise levels.
- Use noise control measures or wear and maintain hearing protection as required.
- Attend training on noise exposure and the requirements of the HCP.
- Employees included in the HCP will have medical evaluations and follow-up audiograms scheduled by the "Company" as a condition of employment.

- Report any complicating medical problems to their Supervisor as soon as possible.

The “Company’s” Audiometric Contractor is responsible for:

- Scheduling and conducting baseline and annual audiometric tests at the request of Safety, TEI Managers and/or Human Resources.
- Evaluate baseline and annual audiograms to establish a hearing threshold and annual retests will be compared to the baseline to determine if a STS has occurred.
- Comply with all requirements of the OSHA standard on hearing conservation including test location, equipment calibration, and recordkeeping requirements.
- Evaluation of hearing protector attenuation for specific noise environments and reporting findings in writing to the Safety Director and appropriate Division Manager.

Training

The formal written Hearing Conservation training program is to provide TEI employees with the necessary understanding, skills, and knowledge to safely perform their jobs. Employees who are exposed to noise exceeding the 8-hour time-weighted average (85 dBA) or the peak (140 dB) must be trained, initially and at for TEI New Hires on the following:

- Instruction on proper selection, fitting, use and care of hearing protection.
- Explanation of the effects of noise on hearing.
- Description of the disadvantages/advantages of each type of hearing protection.
- Contents of TEI’s Hearing Conservation Program
- Emphasis on the importance of using/wearing hearing protection both at work and at home.

Initial and refresher training are to be provided to employees. Refresher training must be conducted annually and whenever:

- An employee’s duties change;
- Whenever hazards at the worksite change; or
- An evaluation of the Hearing Conservation program identifies inadequacies in the employee’s knowledge.

Recordkeeping Requirements shall include, but not be limited to:

- Records on area noise testing exposure will be accurately maintained for 5 years.
- All employee audiometric test records will be actively maintained for the duration of employment plus 5 years. Records will then be removed and handled according to the “Company’s” records retention policy.
- Audiometric test records will include:
 - Name and job classification;
 - Date of the audiogram;
 - Examiner’s name;
 - Date of audiometer calibration; and
 - Employee’s most recent noise exposure assessment.
- Certification of training with employee names, last 3 digits of the employee’s social security number, identity of trainers and training dates. The sign in sheet shall contain a syllabus of training material utilized (i.e., powerpoint, video, test, handouts, etc.)
- An accurate record of all employees test records shall be retained for a minimum of two (2) years.
- All employees audiometric test records must be retained for the duration of the affected employee’s employment.
- Records will be provided on request to employees, former employees, Authorized Union Representatives and OSHA inspectors/auditors.

Measurement of Noise

Whenever it is suspected that an employee's exposure *routinely* equals or exceeds an 8 hour TWA of 85 dBA the Company will order a "Noise Measurement" to be performed. The results of the measurements are used to determine which, if any, controls are appropriate to reduce employee exposure to noise.

- This will include the monitoring of continuous, intermittent, and impulse sounds between 80 and 130 decibels.
- All instruments will be of the proper type and will be calibrated immediately prior to use.

This "Noise Measurement" will be repeated whenever a change in the work area, work site occurs where additional employees are exposed above the action level or where the previously issued hearing protection is inadequate for protecting the employee(s).

Management will notify Supervisory Personnel, in writing, of employees who are confirmed to be exposed to excessive levels of noise, regardless of the use of hearing protectors.

- Notification will include a statement regarding the Supervisor's responsibility to work with Human Resources in the coordination of the enrollment of the affected employee(s) in a medical surveillance program, implement feasible engineering controls, or provide hearing protectors. A copy of the notice and subsequent actions taken to control the noise will be signed by TEI Supervisory Personnel, the affected Employee and then returned to Safety and/or Human Resources.

A copy of the most current noise measurement results will be posted at each individual worksite for the duration of the project.

Employees are not to be exposed to impulsive or impact noise exceeding 140dB peak sound pressure level.

Employee Rights

- Employees will be notified, in writing, by the President if exposed at or above the 85 dBA TWA.
- Employees will be allowed to observe or have a representative observe area noise monitoring.
- Employees will receive an initial baseline audiogram within six (6) months of being enrolled in the HCP and will be retested annually for as long as they remain enrolled. These tests will be conducted at no charge to the employee.
- Employees may choose from a variety of styles of hearing protection and will be instructed in how to wear and maintain the protection selected. At TEI all employees will receive hearing protection free of charge.
- Employees will have access to their monitoring and audiometric testing records upon written request, or an in person request to TEI's Human Resources representative.

Audiometric Testing

- Audiometric testing will be provided to all employees whose exposure routinely exceeds an 8-hour Time Weighted Average (TWA) of 85 dBA.
- Testing will be conducted by properly certified or licensed audiologists, otolaryngologists, physicians or technicians.
- Whenever an employee is routinely exposed at or above the action level, a baseline audiometric test must be conducted within 6 months.
 - A baseline audiogram for each exposed employee shall be scheduled and performed within 6 months of the first exposure.
- Audiometric tests must not be conducted until the employee has at least 14 hours without exposure to workplace noise (i.e., over a weekend) or has been furnished and worn hearing protection for this period.

Audiometric Testing (cont.)

- Annual retesting will be conducted if an employee continues to be routinely exposed to an 8 hour TWA of 85 dBA or more.
- Retesting will include a comparison of an employee's baseline audiogram with the annual retest to determine if a threshold shift has occurred. If a standard threshold shift is indicated, the employee will be notified in writing by Human Resources within 21 days.

Standard Threshold Shift (STS)

- Any STS must be evaluated by a physician or other licensed professional to determine if it is work-related.
 - This evaluation will be done at no cost to the employee.
- Employees who are wearing hearing protection, who experience a STS, will be given approved hearing protection devices to choose from. Upon their selection they will be immediately, refitted and retrained on the particular type of hearing protection devices; proper use, limitations, storage and disposal.
- The "Company's" Audiometric Contractor will refer, for additional clinical audiological or ontological examination, any employee who has experienced a STS whom he/she suspects as having a medical problem that caused have resulted in such a shift.
 - Such referrals may also be made if the Audiometric Contractor suspects that medical problems of the ear have been caused or aggravated by the employees choice/use of hearing protection.
- When a STS has occurred, it must be recorded on the OSHA log 300 as an occupational illness within 7 days of the notification. The date listed for the occupational illness will be the date that the STS is first diagnosed.
 - At TEI these cases shall be recorded on the OSHA log 300 as "Privacy" cases.

Noise Reduction and Controls

Excessive noise shall be reduced or eliminated whenever possible. This shall include the implementation of engineering and/or administrative controls, when feasible. When engineering and administrative controls are not feasible, or during the evaluation and implementation of such controls, hearing protective equipment shall be used to protect employees as needed from excessive noise exposure.

- Engineering Controls are used to control the hazard at its source and should be implemented prior to using administrative controls whenever possible. The basic concept behind engineering controls is that, to the extent feasible, the work environment and the job itself should be designed to eliminate hazards or reduce exposure to hazards. These may include:
 - Quieter tools, equipment, machinery
 - Quieter processes
 - Reduction of noise transmission
 - Isolation of machinery/equipment or the machinery/equipment operator
 - Proper maintenance of machinery and/or equipment
- Administrative Controls do not reduce or eliminate the hazard they simply reduce employee exposure to the hazard. Administrative controls may include:
 - Rotation of employees to limit exposure times
 - Flexible tool, equipment and machinery operation schedules to limit exposure
 - Work task arrangements that reduce the time an employee must spend in a noisy area
 - Signage must be installed in all locations, and on all job sites, where noise levels are expected to exceed 90 dBA due to the operation of noisy equipment or machinery, signage must be installed to warn people that they must wear hearing protection when the noisy equipment is in use. Contact the TEI Warehouse Manager to order approved signage.

Effects of Noise - Physical and Psychological

Short term exposure to loud noise can cause a temporary change in hearing (your ears may feel stuffed up) or a ringing in your ears (tinnitus) that may go away within a few minutes or hours after leaving the noise. Repeated exposure to loud noise, however, can cause tinnitus and/or permanent hearing loss. There is no medical treatment for noise induced hearing loss and most hearing aids are not effective for many types of hearing loss.

The effects of exposure to loud noise aren't limited to hearing-related issues. Loud noise can create physical and psychological stress, reduce productivity, interfere with communication and concentration, and contribute to workplace accidents and injuries by making it difficult to hear warning signals. The effects of noise-induced hearing loss can be profound, limiting your ability to hear high frequency sounds, understand speech, and seriously impairing your ability to comprehend and communicate.

- If you already have had hearing loss in one or both ears, it is more important to wear hearing protection. If you are exposed to noise at work or at home, your hearing will continue to deteriorate. Turning off or removing a hearing aid is not hearing protection and does not protect your ears from further damage.
- Noise induced hearing loss typically starts in the high frequencies. First you can hear your brakes squeak when everyone else can, then you can't hear your watch tick. Later, you begin to have trouble understanding what people say to you. This loss is permanent in many cases and is completely avoidable. TEI is making every effort to help you prevent this loss. Help us – wear your hearing protection correctly whether you are at work or at home. Avoid unprotected noise exposure!

Regulations and Other Applicable Standards

OSHA 29 CFR 1910.95	"Occupational Noise Exposure" and Relevant Appendices
OSHA 29 CFR 1904.5	"Determination of Work Relatedness"
OSHA 29 CFR 1904.10	"Recording Criteria for Cases Involving Occupational Hearing Loss"
ANSI SI.11 – 1971	"Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets"
ANSI SI.25 – 1978	"Specification for Personal Noise Dosimeters"
ANSI SI.4 – 1971	"Specification for Sound Level Meters"
ANSI S3.6 – 1969	"Specification for Audiometers"

Appendix A – Employee STS Notification Letter



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
• 330-686-2300

DATE: (Current Date)

TO: (Employee Name and Address)

FROM: (TEI Human Resources Representative)

SUBJECT: Standard Threshold Shift (STS)

The results of your recent OSHA Physical Examination indicate you have sustained a Standard Threshold Shift (STS) in your hearing ability. An STS is a permanent hearing loss of 10 decibels or greater averaged over the 2000, 3000, and 4000 Hertz frequency ranges in either ear. This is based on a comparison of your most recent audiogram with your initial baseline audiogram. Allowances have been made for the contribution of aging to the change in hearing level.

The 2000 to 4000 Hertz frequency range is considered to be part of the speech frequency range. Losses in this range will eventually make it difficult to understand normal conversation. You may start to notice that people have to shout to make you understand. Telephone and radio use will be affected due to the absence of face-to-face contact. Reduction of these types of problems with the use of effective hearing conservation methods will enhance your quality of life.

As your employer, it is our responsibility to inform you of this hearing loss and provide you with information to preserve your present hearing level without additional losses. It is necessary to continue to wear effective hearing protection, earplugs, or muffs, when working in noisy environments. Noise induced hearing loss is a gradual process that you may not realize is occurring until it's too late and there is no treatment for it.

A meeting was held with you on [mm/dd/yy] to discuss information related to your noise exposure on and off the job. Methods of controlling your personal noise exposure, the effective use of hearing protection. TEI may also conduct additional monitoring of workplace noise exposure levels in your area, or on your job site, in the future. If so, you will be provided with a copy of the results.

The following items were discussed:

- Explanation of STS and ways to prevent hearing loss
- Use of properly fitted hearing protection
- Workplace noise levels data and future monitoring

Criteria Met:

(Check appropriate box) ☐ STS ☐ OSHA Recordable STS

TEI Representative Signature: _____

Date: _____

Employee Signature: _____

Date: _____

cc: Human Resources

MYTH

VS

FACT

THE TRUTH ABOUT HEARING LOSS

MYTH

Portable music and video devices do not affect your hearing.



FACT

1.1 billion people are at risk for hearing loss due to unsafe personal use of portable music devices.



WHAT TO DO

Limit your use of portable devices and keep the volume level at the half-way point or under. If you have to take out your ear buds to hear someone speaking at an arm's length away, the volume is probably unsafe.

MYTH

Hearing loss does not affect newborn babies.



FACT

Approximately 6 out of 1,000 babies have a significant hearing problem at birth. And, more than 4,000 babies are born with a hearing loss each year.



WHAT TO DO

Make sure your newborn's hearing is screened before leaving the hospital or within the first couple weeks of life. If he or she does not pass the screening, schedule an appointment with an audiologist.

MYTH

Everyone who has hearing loss is older than age 65.



FACT

Half of those individuals with hearing loss are younger than age 65.



WHAT TO DO

If you suspect a hearing loss or have ringing in the ears, visit an audiologist.

MYTH

Everyday loud activities do not affect your hearing.



FACT

Noise-induced hearing loss can be caused by lawn/farm equipment, concerts, sporting events, fireworks shows, hair dryers, firearms, and alarm clocks. A single exposure to excessive noise can also cause permanent hearing loss.



WHAT TO DO

Noise-induced hearing loss is permanent and is almost always preventable! Wear hearing protection when around sounds louder than 85 decibels, turn down the volume, and walk away from loud noise.

MYTH

Dizziness and balance disorders are simply inconvenient and not that harmful.



FACT

Untreated dizziness and balance disorders can increase fall risk and result in hip fractures, broken bones, and head trauma.



WHAT TO DO

If you feel dizzy regularly or suspect a balance disorder, visit an audiologist who specializes in vestibular evaluation and treatment.

MYTH

Hearing loss does not affect your day-to-day life.



FACT

Individuals with untreated hearing loss are often excluded from communication and have feelings of loneliness, isolation, depression, and frustration.



WHAT TO DO

If you suspect a hearing loss, visit with an audiologist who can evaluate your condition and provide rehabilitation and treatment.

HEARING LOSS IS THE THIRD MOST COMMON HEALTH PROBLEM IN THE UNITED STATES.



APPROXIMATELY 1 IN 8 CHILDREN AGES 6-19 HAVE NOISE-INDUCED HEARING LOSS.



APPROXIMATELY 30 MILLION WORKERS ARE EXPOSED TO HAZARDOUS LEVELS OF NOISE ON THE JOB.



AMERICAN
ACADEMY OF
AUDIOLOGY

FACT: Audiologists are the primary health-care professionals who evaluate, diagnose, treat, and manage hearing loss and balance disorders in adults and children. If you think you may have a hearing loss, visit www.howsyourhearing.org and click on "Find an Audiologist."

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	• Origination	Safety Div.	Division Management		08/01/12
01	• Updates to Division Managements Responsibilities	Safety Div.	Division Management	12/28/15	12/28/15
02	• Updated "Effects of Noise"	Safety Div.	Safety Div.	11/18/18	11/18/18
03	• Updated STS Notification Letter • Updated Training Requirements • Added "Regulations & Other Applicable Standards" • Addition of Myth vs Fact by the American Academy of Audiology	Safety Div.	Safety Div.	08/31/19	10/01/19
09/2020	• Annual Review – No Changes	N/A	Management w/Safety	N/A	N/A



Thompson Electric, Inc.

Personal Protective Equipment (PPE)

**TEI PROGRAM SAFETY-022 Personal Protective Equipment (PPE) R2
202412**

Introduction

The use of Personal Protective Equipment (herein referred to as PPE) to eliminate injuries is an important component of Thompson Electric's safety program. This policy has been established to aid the company in two basic objectives regarding the use of Personal Protective Equipment:

- To protect the wearer from safety and health hazards; and
- To prevent injury to the wearer from incorrect use and/or malfunction of the PPE.

In order to ensure the safety of all individuals at a work station, work site and/or our warehouse Thompson Electric expressly forbids any employee, subcontractor, or vendor from furnishing and using their own Personal Protective Equipment. Thompson Electric shall furnish at no cost to the employee any required Personal Protective Equipment.

Policy

It is the policy of Thompson Electric to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public. Therefore, Thompson Electric has established this written program and procedures to be applied when there is reasonable probability that injury or illness can be prevented by the use of Personal Protective Equipment.

Personal Protective Equipment should be considered a means of controlling hazards only after the following have been implemented:

- Hazard elimination or substitution;
- Engineering controls; and
- Administrative controls e.g., safe work practices

This written program and procedure establishes the methods and accountability for Thompson Electric's Personal Protective Equipment (PPE) Program. It provides:

- Guidelines for selecting PPE based on the hazard(s) present;
- Provisions for training and employee discussion on the need for task specific hazard assessments;
- PPE requirements for the head, eye, face, ear, hand, foot, leg, body and respiratory system (please reference Thompson's Respiratory Protection Policy for complete respiratory protection details); and
- Use and maintenance of PPE.

This policy and procedure affects any employee who is exposed to hazards that require Personal Protective Equipment.

Responsibilities

It is the responsibility of all TEI employees to ensure compliance with this written program and its related procedures. It is also the responsibility of each Thompson Electric employee to immediately report any unsafe act or condition to their immediate supervisor. Specific responsibilities in regards to this program are outlined below.

It is the responsibility of Thompson Electric to provide and maintain equipment that is adequate and safe in design and construction (i.e., ANSI, ASME, MSHA standards), at no cost to the affected individual.

TEI Safety Department shall be responsible for the following:

- Review and update of Thompson Electric Personal Protective Equipment Program to conform to current CFR and ANSI standards.
- Ensure compliance with standards set forth in this program and policies by periodic inspection of worksites.
- Providing training as set forth in the program and;
- Providing consultative and audit assistance to ensure effective implementation of this written program and procedure;
- Identifying the employees affected by this written program and procedure.
- Working with purchasing to ensure that all newly purchased PPE complies with current safety regulations.
- Conduct Hazard Assessments and train other designated employees to perform Hazard Assessments.
- Ensuring employees who are assigned PPE are keeping their assigned PPE available and maintained in a sanitary and reliable condition at all times.
- The equipment, materials, and protective devices provided are used only as prescribed.
- The Safety Department may delegate the responsibility of various aspects of the PPE Program to a Qualified/ Competent Person. However, the Safety Department's ultimate responsibility for their aspects of the program cannot be delegated.

Supervisory Personnel shall be responsible for the following:

- Communicating appropriate needs to the TEI Safety Department.
- Ensures employees are properly trained before using PPE and that issued PPE is being worn properly.
- Employees who are assigned PPE are keeping their assigned PPE available and maintained in a sanitary and reliable condition at all times.
- Ensuring that no employee is allowed to work in any hazardous environment without the proper protective equipment consistent with the hazard.
- With the approval of the Vice President, the Supervisor may delegate the responsibility of various aspects of the PPE Program to another Qualified Person/Competent Person. However, the Supervisor's ultimate responsibility for his/her aspects of the program cannot be delegated.

Employees shall be responsible for the following:

- Complying with all applicable guidelines contained in this written program and procedure.
- Report any unsafe act associated with this safety policy and procedure to their immediate Supervisor.
- Identify and report any hazards that may require PPE.
- Employees who are assigned PPE are to keep their assigned PPE available and maintained in a sanitary and reliable condition at all times.
- Employees are to have the PPE replaced when the PPE becomes worn or unsafe.

Training

The formal written Personal Protective Equipment training program is to provide employees with the necessary understanding, skills, and knowledge to safely perform their jobs. The component of the affected employee training program includes, but is not limited to, instruction on:

- Hazard Awareness;
- When PPE is necessary;
- How to don, remove, adjust, and wear PPE;
- Limitations of PPE;
- Proper care, maintenance, useful life and disposal of PPE.

Retraining is to be provided to employees at a minimum annually. Retraining will also be provided/conducted whenever:

- An employee's duties change, requiring additional PPE;
- Whenever hazards in the work place change (rendering previous training obsolete);
- An employee demonstrates lack of use, improper use or insufficient skill and understanding of the PPE he/she has been issued.
- The type/brand of PPE is changed from the equipment they were originally trained on.

All employees must be trained before the specific Personal Protective Equipment is put into use.

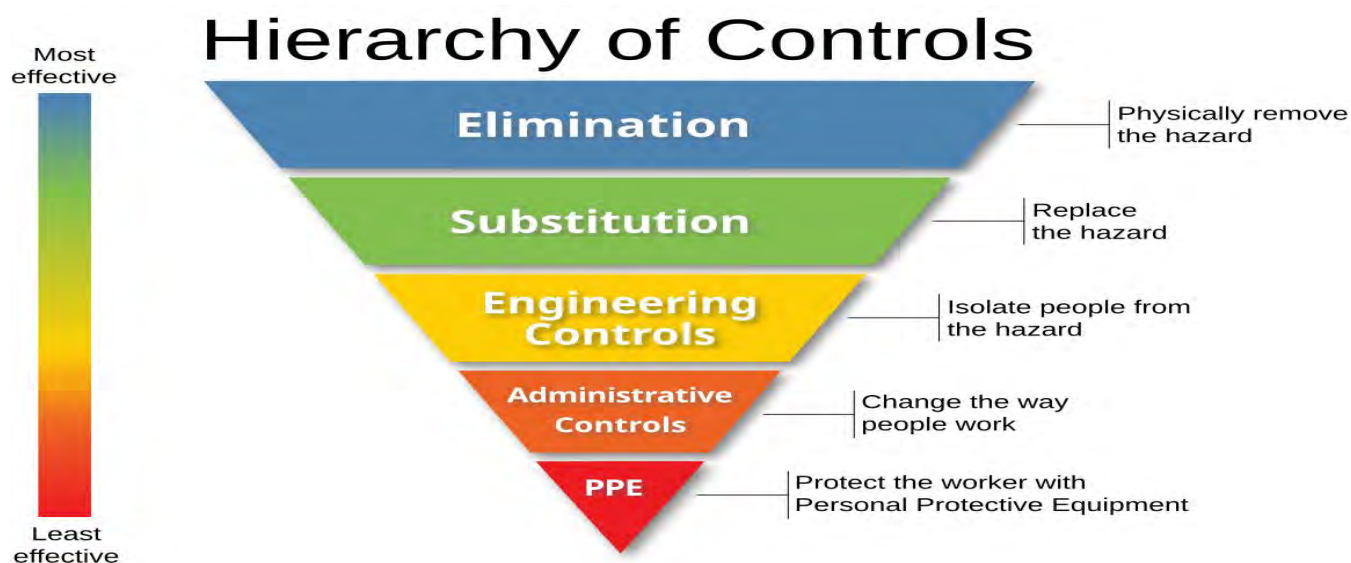
All employees must be trained that defective and damaged Personal Protective Equipment shall neither be used nor stored at any time. Questions regarding condition should be immediately referred to the site Competent Person, Supervisor or Safety Department for resolution.

Recordkeeping requirements shall include, but not be limited to:

- All PPE related training shall be documented.
 - Certification of training with name, identity of trainers, training dates, class curriculum, means of gauging competency after training (pass/fail criteria).

Controlling Hazards

PPE devices alone should not be relied on to provide protection against hazards. TEI's hazard control philosophy is based on the NIOSH Hierarchy of Controls shown below. TEI shall utilize PPE as the 'last line of defense' to mitigate hazards that still exist after all of the higher tiers of the Hierarchy of Controls have been applied.



Six Step Assessment Process

Each work station, work site and/or existing structure(s) will be assessed to determine if hazards are present which necessitate the use of PPE. Thompson Electric will verify that the assessment has been completed through a written certification. If it is determined that such hazards are present, where applicable, Thompson Electric will select personal protective equipment for the affected employees and communicate the selection decisions to all affected employees, regardless of status.

It is important to consider certain general guidelines to assess foot, head, eye and face, and hand hazard situations that exist in an operation or process, and to match the protective devices to the particular hazard.

➤ Step One: Conduct a Survey

The most effective strategy for surveying the work area is to use a team of individuals conduct the assessment. The supervisor, Competent Person and/or experienced employee should conduct a walk- through survey of the areas in question. The purpose of the survey is to identify sources of hazards to workers and co-workers. Consideration should be given to the basic hazard categories:

- Impact
- Penetration

- o Compression (Roll-Over)
- o Chemical
- o Temperature Extremes
- o Hazardous Atmospheres
- o Noise

➤ **Step Two: Determine Sources of Hazards**

During the walk-through survey determine if any of the following basic hazard sources exist:

- o Sources of motion; i.e., machinery or processes where any movement of tools, machine elements or particles could exist, or movement of personnel that could result in collision with stationary objects;
- o Sources of high temperatures that could result in burns, eye injury or ignition of protective equipment, etc.;
- o Chemicals that could contact skin and eyes;
- o Sources of hazardous atmospheres;
- o Sources of light radiation, e.g., welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.;
- o Sources of falling objects or potential for dropping objects;
- o Sources of sharp objects which might pierce the feet or cut the hands;
- o Sources of rolling or pinching objects which could crush the feet;
- o Layout of workplace and location of co-workers; and
- o Electrical hazards.

➤ **Step Three: Organize the data**

Following the walk-through survey, it is necessary to organize the data and information for use in the assessment of hazards. The objective is to prepare for an analysis of the hazards in the environment to enable proper selection of protective equipment. In addition, injury/accident data should be reviewed to help identify problem areas.

➤ **Step Four: Analyze the data**

Having gathered and organized data on a work station, work site and/or existing structure(s), an estimate of the potential for injuries should be made. Each of the basic hazard categories should be reviewed to determine the:

- o Nature of the hazard;
- o Degree of risk;
- o Seriousness or severity of potential injury;
- o Possibility of exposure to several hazards simultaneously.

Next the probability or likelihood that an accident will occur needs to be determined. This can be accomplished by analyzing a set of conditions or factors associated with a hazard. They are:

- o The number of employees exposed;
- o The frequency of exposure;
- o The duration of exposure;
- o The proximity of employees to the point of danger;

- o The adequacy of training;
- o The adequacy of supervision; and
- o The adequacy of workstation design.

➤ **Step Five: Select the Personal Protective Equipment**

After completing the hazard assessment, select the right PPE for the job:

- o Become familiar with the potential hazards and the type of protective equipment that is available, and what it can do, i.e., splash protection, impact protection, etc.;
- o Compare the hazards associated with the environment; i.e., impact velocities, masses, projectile shape, radiation intensities, with the capabilities of the available protective equipment;
- o Involve employees in the selection process;
- o Select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards; and
- o Fit the user with the protective device and give instructions on care and use of the PPE.
It is very important that the end user be fit properly and is made aware of all warning labels for and limitations of their assigned PPE.

Fitting the device

PPE that fits poorly will not properly protect employees. And, if the PPE is not comfortable, the employee is not likely to wear it long. Protective devices are generally available in a variety of styles and sizes, and care should be taken to make sure that the employee gets the right size for him or her.

Devices with adjustable features

It's important to realize that when it comes to PPE, "one size DOESNOT fit all!" Adjustments should be made on an individual basis for a comfortable fit that will keep the protective device in the proper position. Where manufacturer's instructions are available, they should be followed carefully.

➤ **Step Six: Reassess for Hazards**

It is the responsibility of management to reassess the workplace hazard situation as necessary, by identifying and evaluating new equipment and processes, reviewing accident records, and reevaluating the suitability of previously selected PPE.

PPE Selection Guidelines

After completion of the hazard assessment, the general procedure for selection of personal protective equipment is to:

- o Become familiar with the potential hazards and the type of protective equipment that is available, and what it can do;
- o Compare the hazards associated with the environment;
- o Select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards; and
- o Fit the user with the protective device and give instructions on care and use of the PPE.

Head Protection

- Employees working in areas where there is possible danger of head injury from impact, from falling or flying objects, or when working with high-voltage equipment.
- Thompson Electric employees are required to wear hard hats that:
 - Resist a reasonable impact force without breaking or collapsing the shell or damaging the internal suspension.
 - Dissipate and/or absorb as much impact force as possible to avoid transmitting the force to the head, spinal column, or other parts of the body.
 - Resist impact penetration.
 - Provide electrical protection as applicable.
- Hard Hats approved for use by Thompson Electric are either Type I or Type II Class E, and are clearly marked with the American National Safety Institute label (ANSI Z89.1). Type I hardhats are standard issue unless Type II hardhats are required by the customer or based on hazards present.
 - Type I hard hats provide protection from a blow to the top of the head.
 - Type II hard hats provide protection off-center, side and top of the head.
 - Class E offers dielectric protection up to 2,200 volts for the head.
 - Class C hard hats are not to be used as they provide no electrical protection.
- Hard hats will be disposed of whenever the helmet has received impact or shows signs of deterioration.
- It is mandatory that hard hats be worn in all construction areas, including roads, shops, and outlying work areas where there is a potential exposure to falling or flying material.
- Each helmet consists essentially of a shell and suspension. Ventilation is provided by a space between the headband and the shell.
- Each helmet will be accompanied by manufacturer's instructions explaining the proper method of adjusting and replacing the suspension and headband.
- **Fitting:**
 - Headbands are adjustable in 1/8" – size increments. When the headband is adjusted to the right size, it provides sufficient clearance between the shell and the headband. The removable-replaceable type sweatband will cover at least the forehead portion of the headband.
 - The shell will be of one-piece seamless construction and designed to resist the impact of a blow from falling material. The internal cradle of the headband and sweatband forms the suspension. Any part that comes in contact with the wearer's head will not be irritating to "normal" skin.
- **Inspection & Maintenance:**
 - Manufacturers will be consulted with regard to paint or cleaning materials for their helmets since some paints and thinners may damage the shell and reduce protection by physically weakening it or negating electrical resistance.
 - The accepted method of cleaning shells is dipping them in hot water (approximately 140° F) containing a good mild detergent for at least one minute. Shells should then be scrubbed and rinsed in clear hot water. After rinsing, the shell should be carefully inspected for any signs of damage.

- All components, shells, suspensions, headbands, sweatbands, and any accessories, will be visually inspected daily for signs of dents, cracks, penetration, or any other damage that might reduce the degree of safety originally provided.
- Employees will be cautioned that if unusual conditions occur (such as higher or lower extreme temperatures, than normal), or if there are signs of abuse or mutilation to the helmet or any component, the margin of safety may be reduced.
- Helmets should not be stored or carried on the rear-window shelf of an automobile, since sunlight and extreme heat may adversely affect the degree of protection.
- **Winter Liners & Chin Straps:**
 - All winter liners shall be fabricated of materials that will not support combustion.
 - Winter liners and chin-straps used in conjunction with Class B helmets for protection from electricity shall not contain any metallic or other conductive material.
- Bump Caps or hats shall never be used as a substitute for safety helmets (hard hats) where there is danger from falling objects, flying particles, or electrical shock.
- A hat, cap, or net shall be worn where there is danger of hair entanglement in moving parts of machinery or equipment, or where there is exposure to means of ignition.
- Hair enclosures shall be designed to enclose all loose hair and be adjustable to accommodate all head sizes.
- Material used for a hair enclosure shall be durable, fast-dyed, nonirritating to the skin and capable of withstanding frequent cleaning.
- Hair enclosures shall not be reissued from one employee to another unless it has been thoroughly sanitized.
- Hair enclosures used in areas where there is exposure to sparks, hot or molten metals, or ignition from heat, flames, or chemical reaction shall be made of materials that are non-burning or flame retardant and do not melt.

Foot Protection

- Employees will wear protective footwear when working in areas where there is a danger of foot injuries from heavy falling objects, rolling objects, objects piercing the soles, and where employees' feet are exposed to electrical hazards.
- Work boots with safety toe protection are required on all TEI jobsites and warehouses for employees performing work.
 - Visitors to these areas must wear footwear that are appropriate for the environment i.e., no open-toed shoes, sandals, etc.
- All protective footwear must comply with any of the following:
 - ASTM F-2412-2005 and ASTM F-2413-2005
 - ANSI Z41-1999
 - ANSI Z41-1991
- All work boots must be electrical hazard (EH) labeled.
- Over-the-shoe boots are available. Boot outer shell materials include PVC, rubber, butyl, and neoprene. Temperature, abrasion, and chemical exposures in the workplace must be considered in the selection of the material.
- Metatarsal protection is required when there is substantial risk of a crushing injury to the foot.

Eye & Face Protection

- Flying particles, cuts, chemicals, injurious light, heat rays, and blows to the face and eyes cause eye injuries. To prevent such injuries Thompson Electric offers many types of eye and face protection devices.
- Employees will be issued, and will, use appropriate eye or face protection when exposed to eye or face hazards. From flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation. Protectors must meet the following minimum requirements.
 - Provide adequate protection against particular hazards for which they are designed;
 - Be reasonably comfortable when worn under the designated conditions;
 - Fit snugly without interfering with the movements or vision of the wearer;
 - Be durable;
 - Be capable of being disinfected;
 - Be easily cleanable;
 - Be kept clean and in good repair.
- Employees whose vision requires the use of corrective lenses and who are required to wear protective eyewear shall wear one of the following types of goggles or eye glasses:
 - Eye glasses whose protective lenses provide optical correction;
 - Goggles that can be worn over corrective eye glasses without disturbing the adjustment of the eye glasses; and
 - Goggles that incorporate corrective lenses mounted behind the protective lenses.
- Design, construction, testing, and use of eye and face protection will be in accordance with ANSI Z87.1-1989. Lenses and frames shall be marked with the manufacturer's symbol to indicate compliance with ANSI Z87.1-1989.
 - The use of approved lenses in unapproved frames is not acceptable.
 - Tinted lenses in safety glasses are permissible only when in the outdoors or indoors when the sun or artificial lighting are creating a hazard due intensity of the light.
- Side Shields should be used on safety glasses worn in buildings or areas designated as eye-hazard areas. Side shields should also be used on safety glasses worn in eye-hazard operations, unless it has been specifically determined for a particular operation that it is not possible for injurious objects or energies to enter the wearer's eyes from the side or that the reduced peripheral vision would pose a greater hazard to the employee.
 - Side shields shall not be easily detachable from the frames: slip-on types of side shields are not permitted for use by Thompson Electric employees and/or sub- contractors.
 - Snap-on side shields are permissible only if they are clearly marked with the ANSI symbol and fit tightly, with no gapping or sliding movement, onto the glass's frames.

Hand & Arm Protection

- Thompson Electric requires all employees to use appropriate hand and arm protection when employees' hands and arms are exposed to hazards such as:
 - Skin absorption of harmful substances;
 - Severe cuts or lacerations;
 - Severe abrasions;
 - Punctures;
 - Chemical Burns;
 - Thermal Burns & Harmful Temperature Extremes
- The required hand and arm protective wear will be based upon the hazard of the risk. TEI provides hand protection with various degrees of cut resistance, puncture resistance, impact protection, and abrasion resistance. Gloves with the appropriate hazard protection for the task shall be made available as needed.
- Reusable gloves and arm sleeves shall be inspected regularly for damage, replaced when necessary, and stored in a protected location away from chemical exposure when not in use.

Ear Protection

Exposure to high noise levels will cause hearing loss or impairment. It can create physical and psychological stress. There is no cure for noise-induced hearing loss, so the prevention of excessive noise exposure is the only way to avoid hearing damage. Specially designed protection is required, depending on the type of noise encountered.

- No employee shall be permitted to work in an area where the sound level exceeds 85 decibels unless hearing protection that reduces the exposure to a level below 85 decibels (85 dbA) is worn.
- Warning signs shall be posted in any location where the sound level exceeds 85 dbA.
- All types of heavy equipment (dozers, loaders, graders, mixers, etc.) require hearing protection unless specifically instructed otherwise.
- Most earplugs are disposable, to be used one time and then thrown away. The non-disposable type should be cleaned after each use for proper protection
- Earmuffs need to make a perfect seal around the ear to be effective. Glasses, long sideburns, long hair, and facial movements, such as chewing can reduce protection. Special equipment is available for use with glasses or beards.
- For extremely noisy situations, earplugs should be worn in addition to earmuffs. When used together earplugs and earmuffs change the nature of sounds;

Torso Protection

Many hazards threaten the torso. Protective garments such as vests, jackets, aprons, coveralls, and full body suits may be necessary to protect employees who handle hot and/or hazardous materials.

- When a need for such a garment is identified, it shall be furnished by Thompson Electric.
- The type of garment that will provide the best protection for a job will depend on the nature of the job and the physical and chemical hazards associated with the job.

Respiratory Protection

The workplace can present hazards to the lungs. Some of the most common hazards are:

- The lack of oxygen; and
- The presence of harmful dust, fogs, smokes, mists, fumes, gases, vapors, or sprays.

Respirators prevent the entry of harmful substances into the lungs during breathing. Some respirators also provide a separate supply of breathable air so work can be performed where there is inadequate oxygen, or where greater protection is needed.

The prevention of atmospheric contamination at work station, work site and/or existing structure(s) should be accomplished as far as feasible by engineering control measures:

- Enclosing or confining the contaminant producing operation;
- Exhausting the contaminant; or
- Substituting with less toxic materials.

When effective engineering controls are not feasible, while those controls are being installed, or during clean-up operations, appropriate respirators will be used.

- The respirator user will be instructed that respirators have their limitations and are not substitutes for effective engineering controls.
- Where respirators are necessary for health protection, specific procedures are necessary to overcome any potential deficiencies and to assure the effectiveness of the equipment.

Traffic Safety Vests

Every affected employee shall wear an approved reflective fluorescent safety vest or, equivalent, under the following conditions:

- When working within a road allowance or on a public way;
- When working on a project where the wearing of a traffic safety vest is required under the Occupational Health & Safety Act and the Regulations for Construction Projects. This includes the directing of traffic;
- In any other location or situation where the Employee may be endangered by vehicular traffic or where being visible is important to his/her safety.

For the purposes of this policy, approved equivalents to a traffic safety vest are T-shirts, jackets, overalls and other approved apparel, which is safety ("blaze") orange or neon yellow in color with reflective tapes on the front and back. High visibility clothing must meet the criteria for ANSI 107-2020 Class 2 reflective.

Revision No.	Description of change(s)	Written By:	Approved By	Revision Date
1	Origination	Safety Div.	Vice President	07/2012
2	- Updated format - Various updates based on updated consensus standards - Full list of edits available in 2024 Annual Update Changes	Safety Dept	VP of Ops	12/2024



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362



Respiratory Protection

2020-2021

Introduction

OSHA requires implementation of feasible engineering controls and/or work practice controls as the primary means of maintaining exposures within permissible limits. This Respiratory Protection procedure provides standards for the selection based on the hazards to which the employee is exposed, proper use and limitation, cleaning and disinfecting, storage, inspection, appropriate surveillance of work area conditions, regular inspection, and evaluation. These elements will be used to protect the life and health of Thompson Electric, Inc. (herein referred to as TEI) employees and our Sub-Contractor employees when working in contaminated or oxygen deficient atmospheres.

This program covers all TEI and sub-contractor employees using any type of respiratory protection including but not limited; filtering face pieces (dust masks), such as used for concrete cutting or welding operations; air-purifying cartridge respirators, such as used for petroleum vapors – organic vapors; positive air pressure respirators, such as used for medical environments; and supplied-air respirators (self-contained breathing apparatus – SCBA) such as may be used for immediately dangerous to life and health environments (IDLH).

Employees shall review a copy of the program. Copies of this program may be obtained from the Division Manager, Project Manager, or Safety Department and will be made available via electronic mediums (i.e., web page, TEI S drive, Outlook Public Folders, etc.) The Division Manager or properly trained and authorized Designee has full authority to make the necessary decisions to ensure the success of this program. This authority includes decisions for the selection and purchasing of the respiratory equipment, and determination of proper respiratory procedures. Periodic spot checks of their work sites will be made to ensure compliance with established guidelines, procedures, and applicable regulations. It is the responsibility of the Division Manager to implement the requirements of this program and ensure that Project Managers, Supervisory Personnel, Employees, and Sub-Contractor Employees follow TEI policies and related procedures.

General

In the Respiratory Protection program, hazard assessment and selection of proper respiratory PPE is conducted in the same manner as for other types of PPE. In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination.

This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used. References: OSHA Standards Respiratory Protection (29 CFR 1910.134).

It is the policy of TEI that all respirators, training, and medical surveillance will be provided to the employee at no cost

Definitions

Administrative/Work Practice Controls – Control methods that don't eliminate respiratory hazards but minimize exposure levels so that workers aren't harmed.

Aerosol – Particles, solid or liquid, suspended in air.

Approved - Evaluated and listed as permissible by NIOSH, for the respirator's intended use.

Cartridge/Canister – A respirator component containing a filter, sorbent, or catalyst that removes specific air contaminants.

Contaminant – A harmful, irritating, or nuisance airborne material.

Disposable Respirator – A respirator for which maintenance is not intended and that is designed to be discarded after excessive resistance, sorbent exhaustion, physical damage, or end-of-use-service-life renders it unsuitable for its intended use.

Dust – Aerosol consisting of solid particles from the breaking up of larger particles.

Exposure Limit – The maximum allowable concentration of a contaminant in the air to which an individual may be exposed. These may be time-weighted averages, excursion limits, ceiling limits and short-term limits.

Filter – A component used in respirators to remove solid or liquid aerosols from the air.

Fit Check – A test conducted by the wearer to determine if the respirator is properly sealed to the face.

Fit Factor – A quantitative measure of how well a respirator protects the wearer. It's the ratio of the concentration of a contaminant in the environment to the concentration inside the mask.

Fit Test – The use of challenge agent to evaluate the fit of a respirator on an individual.

Fume – Solid aerosols formed by the condensation of gas or vapor.

Hazardous Atmosphere – An atmosphere that contains a contaminant(s) in excess of the exposure limit or is oxygen deficient.

High-Efficiency Filter – A filter that removes from the air 99.97 percent or more of the aerosols having a diameter of 0.3 micrometers.

Immediately Dangerous to Life or Health (IDLH) – Any atmosphere that poses an immediate threat to a worker's life, would cause irreversible adverse health effects, or would impair the worker's ability to escape. TEI employees are not permitted to work in an IDLH atmosphere.

Licensed Health Care Professional (LHCP) – A person licensed to provide respirator medical evaluations or examinations. Any health professional that qualifies as a LHCP can perform a medical evaluation/examination. "Qualifies" means that the medical examination or evaluation procedures are permitted by the LHCP's state medical licensing board.

N-Series – The designation for a respirator filter that protects against solid and water-base particulates such as nuisance dust. N-series filters are available in three levels of efficiency: N95, N99 and N100; the higher the number, the less filter breakthrough.

P Series – The designation for a respirator filter that protects against any particulates, including oil-based materials, with no specific time limit. These filters are available in three levels of efficiency: P95, P99, P100; the higher the number, the less filter breakthrough.

Permissible Exposure Limit (PEL) – Regulatory limits for contaminants including, but are not limited to:

Personal Protective Equipment (PPE) – Protective clothing or equipment worn by a worker; includes respirators and all other types of respiratory devices.

Qualified Person – Individual who has training and experience in air monitoring, exposure assessment, and workplace evaluations under the direction of a Competent Person.

R-Series – Designation for a respirator filter that protects against any particulates, including oil-based materials. Wearers of R-series filters are limited to one eight-hour shift if oil aerosols are present. They are available in 3 levels of efficiency: R95, R99, R100; the higher number/less filter breakthrough.

User Seal Check – A set of procedures performed by the respirator user to determine if the respirator has an effective face-to-face piece seal.

SAR – Supplied air respirator. Atmosphere-supplying respirator in which the breathing air is not carried on the person.

SCBA – Self-Contained Breathing Apparatus. A class of respirator that supplies a respirable atmosphere independent of the existing atmosphere.

Tight Fitting Face piece – An inlet covering that forms a complete seal with the wearer's face.

Responsibilities

Division Managers/Project Managers

- Issuing and administering this program and making sure that the program satisfies the requirements of applicable federal, state or local respiratory protection requirements.
- Providing initial and periodic training to employees on respiratory protection, including the selection, use, cleaning, inspecting and storage of respirators.
- Maintaining the training records of all employees included in the training sessions.
- Conducting hazard assessments where respiratory hazards may be present.
- Assisting the respiratory protection program to ensure its continued effectiveness.
- Coordinating annual medical examinations as necessary and maintaining associated records.
- Work with Safety and Warehouse Management in the purchasing of all respiratory protection equipment.
- Assuring that all respirators used by your employees are TEI issued and NIOSH-certified.

Supervisory Personnel of Employees who are required to wear respirators

- Knowing the hazards in their areas that require respiratory protection.
- Knowing the types of respirators that need to be used.
- Enforcing the wearing of respirators when needed.
- Making sure employees are knowledgeable about the respiratory requirements for the areas in which they work.
- Providing training on hazardous chemicals and gases to employees who are new to the jobsite or demonstrate a lack of knowledge.
- Reporting unknown or new exposure situations or deficiencies of respiratory equipment to the Project Manager or Safety Department.

Employees who are required to wear respirators

- Wearing appropriate respiratory protection.
- Properly maintaining their respiratory protection equipment and keeping it clean and in an operable condition.
- Reporting any problems associated with the use of respirators and new conditions that may require investigation.
- Conducting self-fit tests of their respirators each time a respirator is worn.
- Complete/Maintain TEI Monthly Cleaning & Inspection form.
- Know the change out schedule for the particular filter being used with their respirator.

Voluntary Use of Respirators

OSHA requires that voluntary use of respirators, when not required by the company, must be controlled as strictly as under required circumstances. To prevent violations of the Respiratory Protection Standard, employees of TEI are not allowed voluntary use of their own or company supplied respirators of any type.

- Exception: Employees whose only use of respirators involves the voluntary use of filtering (non-sealing) face pieces (dust masks). When a dust mask is used in a voluntary manner then at a minimum TEI must give Appendix D to this standard, entitled "Information for Employees Using Respirators When Not Required under the Standard."

Training Requirements

Effective training for TEI employees who are required to use respirators is essential. The training must be comprehensive, understandable, and recur annually and more often if necessary. Training will be provided prior to requiring the employee to use a respirator in the workplace. The training shall ensure that each employee can demonstrate knowledge of at least the following:

- Why the respirator is necessary and how improper fit, usage, and maintenance can compromise the protective effect of the respirator.
- Limitations and capabilities of the respirator.
- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions'
- How to inspect, put on and remove, use, and check the seals of the respirator.
- What the procedures are for maintenance and storage of the respirator.
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
- The general requirements of this program.

Retraining shall be conducted annually and when:

- Changes in the workplace or the type of respirator render previous training obsolete.
- Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill.
- Other situation arises in which retraining appears necessary to ensure safe respirator use.

Training is divided into the following sections:

- Classroom Instruction:
 - Overview of the Company Respiratory Protection Program & OSHA Standard
 - Respiratory Protection Safety Procedures; Why the respirator is necessary
 - Respirator selection, operation, and use
 - How improper fit, usage, or maintenance can compromise the protective effect
 - Limitations and capabilities of the respirator
 - How to use the respirator effectively in emergency situations, including respirator malfunctions
 - How to inspect, put on and remove, use, and check the seals of the respirator
 - What procedures are for maintenance and storage of the respirator/cartridges
 - How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators
 - Change out schedule and procedure for air purifying respirators
- Hands – On respirator Training:
 - Respirator inspection
 - Respirator cleaning and sanitizing
 - Recordkeeping (i.e., Monthly Respirator Cleaning & Inspection Log)
 - Respirator/Cartridge storage
 - Respirator Fit Check & Test
 - PPE to be worn when cleaning (especially when handling contaminated cartridges)

General Requirements

- It is mandatory that employees wear the appropriate respiratory protection equipment when working where the air contains regulated substances in concentrations exceeding the permissible exposure limit (PEL), and whenever there is potential exposure to a contaminant substance for which the contaminant's material safety data sheet (SDS) prescribes respirator use.
- The Job Foreman will maintain surveillance of work conditions in all places where employees of Thompson Electric work, as well as employee exposure, in order to determine if any additions to or changes in, respirator use requirements are needed.
- This respiratory protection program, the instructions accompanying the respirator, the applicable OSHA regulations and the precautions stated in the MSDS for each of the substances being protected against must be observed by each user of a respirator.
- No employee shall perform a job that requires respirator use, or be present at any place where respirators are necessary, unless all provisions of this Respirator Program are observed.
- Any employee performing such a job, or present in such a place, who is wearing a respirator must immediately cease their work, leave the area and report the matter to their immediate Supervisor whenever any of the following conditions exists:
 - Dizziness, difficulty breathing or other physical or stress disorder;
 - Damage to, or ineffectiveness of, the respirator being worn;
 - The smell or taste of any contaminant or any unfamiliar smell or taste of other such sensation that troubles or concerns the employee; or
 - Lack of the respirator training and instruction required under this Program or the absence of any other requirement of this program.
- Surveillance of conditions in the work area and degree of worker exposure of stress (combination of work rate, environmental conditions and physiological burdens of respirator) must be maintained at all times.
- Changes in operating procedures, temperature, movement of air, humidity and work practices may influence the concentration of a substance in the work area atmosphere. These factors may necessitate periodic monitoring of the air contaminant concentration. If testing is undertaken, it should continue in order to assure that the contaminant has not risen above the maximum capability of the respirators being used.
- Only those individuals who are medically able to wear respiratory protective equipment shall be issued this type of equipment. No employee shall wear a respirator unless they are medically able to do so.
- No one shall be permitted to use a respirator unless they are physically capable of performing their work while wearing the respiratory protection device. This shall be determined by a LHCP.
- Prior to respiratory protection equipment being used by any employee, the employee must complete a medical questionnaire, be examined by a LHCP, and be certified as fit to wear the requested respiratory protection equipment.
- The fitness requirement will be at the discretion of the examining LHCP, but if any respirator user's physical ability changes at any time, they must notify their immediate Supervisor at once and cease respirator use until medical approval for resuming respirator use has been obtained.
- The examining physician will determine what health and physical conditions are pertinent to an employee's respirator usage.
- Each respirator user must receive fitting instructions that include demonstrations and practice on how the respirator should be worn, how to adjust and how to determine if the respirator fits properly.

- Although respirators are designed for maximum efficiency, they cannot protect the wearer without a tight seal between the face piece and wearer. Beards and other facial hair can substantially reduce the effectiveness of a respirator. The absence of dentures can seriously affect the fit of a face piece. To assure proper protection for a face piece, it must be checked by the wearer each time the respirator is put on.
- Corrective lenses worn by employees also present a problem when fitting full face respirators. Special mountings to hold corrective lenses inside full face pieces are available. If corrective lenses are needed, the face piece and lens must be fitted by a qualified individual to provide good vision, comfort, and proper sealing.
- When possible contact lenses should not be worn while wearing a respirator in a contaminated area. Foreign bodies or contaminants that penetrate the respirator may get into the eyes and cause severe discomfort compelling the wearer to remove the respirator.

Respirator Fit & Fit Testing

- Full face piece and half-mask respirators have different fitting characteristics. No one respirator will fit everyone.
- Any employee who finds that they cannot obtain a proper fit with their respirator must notify their Supervisor immediately.
- Upon notification by any worker of any respirator's improper fit, the Supervisor shall not permit the employee to work in any area where respiratory protection is required until the employee is equipped with a proper-fitting respirator.
- The effectiveness of the face piece fit (i.e., tight fitting) of a respirator can be tested either by qualitative or quantitative measures:
 - Qualitative fit testing involves the introduction of a harmless, odorous or irritating substance into the breathing zone of the wearer. A proper fit is indicated if the wearer cannot detect the irritating substance.
 - Quantitative fit testing offers more detailed information on respirator fit. It involves the introduction of an aerosol to the wearer while they are in a test chamber. While the wearer performs exercises that could induce face piece leakage, the air inside the face piece is measured for the presence of the aerosol.

Table 1

Type of Respirator/Faceplate	Qualitative Fit Test	Quantitative Fit Test
Half-face negative-pressure air-purifying respirator (<100 fit factor)	Yes	Yes
Full-face negative-pressure air-purifying respirator (<100 fit factor)	Yes	Yes
Full-face negative-pressure air-purifying respirator (<100 fit factor)	No	Yes
Powered air-purifying respirators (PAPRs)	Yes	Yes
Supplied-air respirators (SARs) or self-contained breathing apparatus (SCBA) used in the negative-pressure mode	No	Yes
Supplied-air respirators (SARs) or self-contained breathing apparatus (SCBA) used in the positive-pressure mode	Yes	Yes

Loose-fitting respirators (i.e., hoods and helmets)	Fit-testing not required
Guidelines to fit-test atmosphere-supplying or powered air-purifying respirators in a negative-pressure mode. Please note that you must remove any modifications made to a respirator face piece for fit-testing and restore it to its original NIOSH-approved configuration before anyone can use it on a THOMPSON ELECTRIC controlled work site.	
Qualitative Fit-Test The respirator must be temporarily converted to a negative-pressure respirator with appropriate filters following the manufacturer's instructions. You may also substitute an identical negative-pressure air-purifying respirator with the same sealing surfaces for the atmosphere-supplying or powered air-purifying respirator.	Quantitative Fit-Test In addition to the qualitative fit-test procedures, you must modify the respirator face piece so that you can sample inside it, midway between the wearer's nose and mouth. To accomplish this, you can either install a permanent sampling probe in a surrogate face piece or use a sampling adapter supplied by the manufacturer.

- Workers who fail a fit test must select another face piece and be retested.
- Any individual may request the use of a respirator because of a nuisance exposure or for personal reasons. These circumstances should be evaluated and respirator use approved, by the Job Foreman if the circumstances favor the use of a respirator.

Respirator Selection

- The company shall provide (at no cost to the individual) appropriate NIOSH approved respiratory protective devices and the employees/individuals shall use these devices whenever necessary to protect their health due to the nature of the work environment.
 - Proper selection of respirators must be made according to the OSHA requirements set forth in 29 CFR 1910.134 (c) and the American National Standards Institute (ANSI) publication "Practices for Respiratory Protection," ANSI Z88.2-1990. Only National Institute of Occupational Safety and Health (NIOSH) approved type respirators shall be purchased and used by Thompson Electric to protect employees/individuals from the airborne contaminants that they have the potential to be exposed to.
 - The nature and extent of the hazard, the work rate, the area to be covered, mobility, work requirements and conditions, as well as the limitations and characteristics of the available respirators are all selection factors that must be considered:

Type of Exposure	Selection Procedure
Particulate Exposure	Respirators will be selected on the basis of: ▪ Potential oil-mist exposure (N,R or P); ▪ Severity of the inhalation hazard (95%, 99% or 100% efficient) ▪ Air-particulate concentration ▪ Availability of 21% oxygen
Vapor & Gas Exposure	Respirators will be selected on the basis of: ▪ Chemical composition ▪ Physical state (vapor or gas) ▪ Air-contaminant concentration ▪ Availability of 21% oxygen

- Although many kinds of breathing equipment are used for protection, the respirators utilized by Thompson Electric fall into one of the following three categories based on how they operate:

- **Air-Purifying Respirators** have an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through an air-purifying element. Air purifying respirators are available in non-powered and powered types:
 - The wearer operates the non-powered types just by breathing.
 - A powered air-purifying respirator is equipped with a blower that passes ambient air through one or more air-purifying elements.

Air Purifying Respirators (APRs)	
Non-powered	▪ Particle-removing ▪ Gas-vapor-removing ▪ Combination particle-gas-vapor-removing
Powered (PAPR)	▪ Particle-removing ▪ Gas-vapor-removing ▪ Combination particle-gas-vapor-removing
Air-purifying respirators may not be used in an oxygen-deficient atmosphere or under conditions immediately dangerous to life and health.	

- **Combination Atmosphere-Supplying & Air-Purifying respirators** will protect a worker who must pass through a hazardous area and who isn't connected to a source of compressed air. The worker uses the air purifier when entering and leaving the hazardous area, then connects to the airline part of the combination respirator at a work area.
 - The time needed to perform a given task usually determines the length of time for which respiratory protection is needed, including the time necessary to enter and/or leave a contaminated area.
 - Unless a specific OSHA standard exists that clearly lists different requirements, respirators shall be selected according to the above instructions and Table 4 and Table 5.
- Respirator Selection choices for environments **not** immediately dangerous to life and health:

Type of Protection	Atmosphere-Supplying Respirator	Air Purifying Respirator
Protection against gases and vapors	Yes	Yes, if the respirator has an end-of-service-life indicator (ESLI) or the employer has an effective change schedule for canisters and cartridges
Protection against particulates	Yes	Yes, if equipped with any of the following: ▪ A high-efficiency particulate air (HEPA) filter certified by NIOSH. ▪ A filter certified for particulates by NIOSH under 42 CFR part 84. ▪ A filter certified by NIOSH under 30 CFR 11 for protection against particulates.
Type of Respirator	Advantages	Disadvantages
Nonpowered Air-Purifying	▪ Small & Compact ▪ Lightweight ▪ Low initial cost	▪ Can't be used in oxygen-deficient/immediate dangerous to life and health (IDLH) environments ▪ Negative pressure inside face piece may result in leakage with improper fit ▪ Selection of proper type critical ▪ Fit-test required ▪ Generally high replacement and maintenance costs
Powered	▪ No mobility restrictions	▪ Can't be used in oxygen-deficient/IDLH

Air-Purifying	- Minimal breathing resistance and discomfort - Fit testing not required with loose-fitting inlet coverings	environments - Selection of proper type critical - Fit-test required for tight-fitting face pieces - Loss of protection with blower failure - High initial and maintenance costs
Type of Respirator	Advantages	Disadvantages
Airline Supplied-Air	- Useable for long periods - Minimal breathing resistance and discomfort - Low weight and bulk - Fit-testing not required with loose-fitting inlet coverings - High level of protection with some devices - Useable in some oxygen-deficient atmospheres - Moderate initial and maintenance costs	- Can't be used in IDLH environments - Trailing air-supply hose restricts mobility and can be damaged - Loss of protection with air-supply failure - Air quality must specific standards - Fit-testing required with tight-fitting face pieces
Hose-Mask Supplied Air	- Useable for long periods - Minimal breathing resistance with some types - Useable in some oxygen-deficient atmospheres - Simple construction/low bulk - Easy maintenance/low cost	- Can't be used in IDLH environments - Fit-test required - Air-supply hose can be damaged - Loss of protection with air-supply failure
Self-Contained Breathing Apparatus	- Maximum mobility with minimum restriction - Maximum level of protection	- Complex - Heavy and bulky - Not suitable for long periods - Fit-testing required for tight-fitting face pieces - Extensive training required - High initial and maintenance costs - Air quality must meet specific standards

Employee Instruction & Discipline

- Every employee who is required to wear a respirator must know how to wear it, care for it, adjust it and know how to determine if it fits properly and provides the appropriate protection.
 - Respirator protection training shall be completed initially and at a minimum annually thereafter.
- The Vice President of Operations is the TEI Respiratory Protection Program Administrator and shall work directly with the Division Manager to provide employees with needed medical clearance, respirator training and instruction.
- Such training and instruction will be given to any employee under TEI's direct and immediate control if the employee has not already received it, or if the employee's prior training/instruction did not satisfy OSHA requirements, or if any doubt or question exists about respirator use or of any of the matters mentioned in this program. *See Training/Re-Training Section of this program.*

- Additional training (on a daily basis if necessary) will be provided by each Qualified or Competent Person whenever it is needed to protect the health and safety of employees.
- Each respirator wearer shall be given an opportunity to handle the respirator, have it fitted properly, test its face piece-to-face seal, wear it in normal air for a period of time long enough to gain familiarity with it, have the respirator fit-tested as required by the applicable OSHA regulation and to wear the respirator in a test atmosphere.
- Each respirator is accompanied by its own set of instructions for proper use, care and protection as well as its limitations. The instructions are printed in or on the respirator box, bag or container. These instructions must be observed.
- Each respirator wearer must read and abide by these instructions.
- Any employee who does not understand the respirator instructions must immediately ask his/her direct Supervisor for assistance.
- Any employee who has not been provided with all of the training and instruction set forth above, or at any time is unsure about the respirator use, care or protection, or has any problems or difficulties with work while wearing a respirator, must inform his or her immediate Supervisor at once so that the employee can be provided with the proper training and instruction.
- Failure to follow all instructions and training on use, care and protection and/or failure to wear respirator during times of exposure can reduce respirator effectiveness and result in sickness or death. The vapors and mists that can be dangerous to health include particulates or gasses that may not be visible with the normal eye.
- It is vital to each employee's health that the respirator training and instruction be observed; AND it is vital to each employee's job.
- Appropriate discipline will be taken against any employee who fails to observe any portion of Thompson Electric's respirator program.
- Persons who provide respirator training and instruction must make sure a written record is provided of the required training and fit-testing.

Exclusive Employee Respirator Usage

- All individuals who may be exposed to harmful vapors, mists, dusts shall be provided with and wear approved respiratory protective devices that will be for their exclusive use.
- An exception to this practice may be permitted for Powered Air Purifying Respirators (PAPR).
- Exclusive use respirators will be marked with the employee name or some other identification to prevent cross contamination.

Medical Evaluation

- All respiratory protection devices impose some kind of physiological stress on the user. Air-purifying respirators, for example, make breathing more difficult. People with heart or lung diseases or other health problems may be harmed by wearing a respirator. Many physicians also counsel pregnant patients against wearing respirators.
- Any employee who uses a respirator will receive a *confidential* medical evaluation. A physician or other Licensed Health Care Professional (LHCP) will do the evaluation at no cost to the employee. The evaluation will be confidential and offered at a convenient time for the worker. The Affected Employee is free to ask the LHCP questions about the evaluation and will receive a copy of the LHCP's written determination.
- TEI will provide the LHCP with the following:
 - The type and weight of the respirator the Affected Employee will use;
 - How long and how frequently the worker will wear the respirator;

- How much physical work the Affected Employee will do while wearing the respirator;
- What other Personal Protective Equipment the worker will wear;
- The temperature and humidity of the working environment;
- A copy of TEI's respiratory protection program and a copy of OSHA standard 29 CFR 1910.134 and the applicable Appendixes.
- A work and personal history form, on the Affected Employee, shall be provided to the physician at the time of examination.
- The physician will determine if the employee is capable of wearing the selected respirator. The LHCP will send a written determination after the medical evaluation. Verbal responses are not acceptable. If the employee has a condition that limits respirator use or the worker needs a follow-up exam, the LHCP must include that information in the determination.
- A follow-up medical evaluation is required when:
 - The LHCP determines that wearing a respirator could adversely affect a worker's health;
 - A worker answers "yes" to any question on the work and personal history form;
 - A worker indicates problems wearing a respirator;
 - A worker changes jobs or tasks that require a different respirator;
- Supervisory Personnel has information that indicates a worker needs to be reexamined. No employee will wear a respirator until a medical exam and fit testing are completed.
 - An employee cannot be fit-tested until a LHCP has performed the medical evaluation and approved the employee for the actual fit-testing of a specific respirator).
 - All Pre-evaluation Medical Forms, Physician's Respirator Use Evaluation Forms and other medical related respirator correspondence will be maintained in the strictest confidence, in a locked file with access restricted to the Company's President. Designated representatives must present the proper authorization (in writing) before receiving access to said information.
- Once an employee has passed the medical exam, a fit-test must be done before the employee uses a respirator.
- The purpose of the fit test is to insure that the mask seals to the face and does not allow air contaminants to enter the mask between the skin and the respirator. An improperly fitting respirator does not protect the wearer.
- The fit test must be performed by a "Qualified Person".
- Employee is to be fit tested with a respirator of the make, model, style, size they will be using.
 - They must be retested at least annually and whenever they change face pieces or they have a physiological change that could affect the face-to-face piece seal.
- There are additional requirements when fit testing for asbestos, benzene and formaldehyde. OSHA's Code of Federal Regulations should be consulted for these additional requirements. Also, reference the MSDS sheet.
- Employees may not wear a tight fitting face piece if the seal is broken; If hair growth or apparel (i.e., eyeglasses) interferes with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as a powered air-purifying respirator.
- Even if a test subject has passed a medical exam, if he or she exhibits difficulty in breathing during the tests, he/she shall be referred to a physician trained in respirator disease or pulmonary medicine to re-determine whether the test subject can wear a respirator while performing her or his duties.

Inspection, Cleaning, Storage and Repair of Respirators

- Each employee who has finished wearing a disposable respirator, or a respirator that is to be used only once, shall place the respirator in the appropriate trash or disposal container. It shall not be taken from the premises for additional use or used a second time under any circumstances.
- Employees must leave the area to wash, change cartridges, or if break-through or resistance is experienced.
- Respirators that are routinely used shall be regularly cleaned and disinfected by the respirator user. Each respirator user is directly responsible for the cleaning and disinfecting of their assigned respirators. Each employee shall be instructed and trained to clean and sanitize their respirators as follows:
 - Remove all cartridges, canisters, and filters, plus gaskets or seals not affixed to their seats. Cartridges will be discarded;
 - Remove elastic head bands;
 - Remove exhalation cover;
 - Remove speaking diaphragm or speaking diaphragm-exhalation valve assembly;
 - Remove inhalation valves;
 - Wash face piece and breathing tube in cleaner/sanitizer recommended by the manufacturer with warm water, use manufacturers recommended temperature;
 - Wash components separately from the face piece, as necessary.
 - Remove heavy soil from surfaces with a hand brush.
 - Cleaner/sanitizer(s) should be located adjacent to each respirator storage facility.
- No one should ever use a respirator that has previously been used by another person, without first cleaning and disinfecting the respirator.
- Cartridges and canisters shall always be stored in their sealed plastic bags until ready for use. Canisters will be stored with original seals intact in the upright position.
- Before putting a respirator on, the user shall inspect the respirator for defects and cleanliness. This must be done every time a respirator is put on.
- The respirator should be inspected, after taking it off and prior to putting the respirator in storage.
- Each respirator not routinely used, but kept ready for emergency use, shall be inspected after each use and at least monthly to assure it is in satisfactory working condition.
- An employee must never wear an unclean respirator or a respirator that is in any way defective.
- Each employee must report any instance of a defective or ineffective respirator to his or her Project Foreman immediately.
- Respirator inspection shall include a check of the tightness of connections and the condition of the face piece, headbands, valves, connecting tube and canisters. Rubber or elastomer parts shall be inspected for pliability and signs of deterioration. Stretching and manipulating rubber elastomer parts with a massaging action will keep them pliable and flexible and prevent them from “setting” during storage.
- Respirator repairs and part replacement shall only be done by experienced persons. There shall be no interchanging of parts; replacement parts shall be approved for the particular respirator in use.
- Attempts to replace components or make adjustments or repairs beyond the manufacturer’s recommendations shall not be made.

- Reducing valves or regulators shall be returned to the manufacturer or to a trained technician for adjustment or repair.
- No repairs shall be made to air purifying respirators. If air purifying respirators are damaged or missing parts they should be disassembled and discarded and a new respirator will be issued.
- Repairs to PAPR should only be performed by a trained individual and according to applicable manufacturer's direction.
- When not in use, each respirator shall be stored in a manner to protect it against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals.
- Clearly marked storage locations shall be assigned to each person who has been issued a respirator. All inspected, cleaned, sanitized and repaired respirators shall be stored according to the following guidelines:
 - Respirators must be protected from dust, sunlight, heat, extreme cold, excessive moisture, and damaging chemicals. Most air purifying respirators can be stored in a clean plastic bag until they are used;
- Respirators must be stored so the face piece and exhalation valve will rest in a normal position and function will not be impaired by the elastomer setting in an abnormal position.
- Dust respirators must be stored in a sealed, clean, plastic bag.
- Respirators shall never be stored in such places as lockers or tool boxes unless they are in clean carrying cases or cartons and the cleaning and storage conditions listed above can be assured.
- No employee shall remove a respirator from the premises.

Quick Reference Schedule For Cleaning, Inspecting, & Storing Respirators			
Situation/Use	Cleaning and Disinfecting	Inspecting	Storage
Exclusive Use	Clean and disinfect as often as necessary to keep sanitary.	Inspect before each use and during cleaning.	Store safe from contamination; make sure valves and face pieces aren't deformed.
More Than One User	Clean and disinfect before another worker uses it.	Inspect before each use and during cleaning.	Store safe from contamination; make sure valves and face pieces aren't deformed.
Training & Testing	Clean and disinfect after each use.	Inspect at least monthly; inspect escape-only respirators immediately before each use.	Store in place and manner free from contamination; make sure valves and face pieces aren't deformed.

Air Line Respirators

- ***Airline respirators without escape capabilities are only to be used in atmospheres where air contaminant concentrations are not IDLH.*** This limitation is necessary because the air supply is solely dependent upon an outside source, which is not readily available to the wearer.
- The compressor should be located and constructed to avoid entry of contaminated air. The air system will be equipped with filters, sorbent beds and alarm systems as necessary to ensure Type 1 - Grade D breathing air is supplied.
 - Sorbent beds/sor filters are to be maintained and replaced per manufacturer's instructions.
 - Compressor will be tagged with the information on the most recent change date of the filter and an authorizing signature (i.e., Job Foreman, Competent Person).

- The compressor will be equipped with a carbon monoxide alarm which will monitor the air to prevent the carbon monoxide in the breathing air from exceeding 10 ppm. The air should then be dried.
- The system needs to be equipped with a compressor capable of supplying air at 110-115 psig at the outlet of the purification system.
- The system shall be equipped with a low pressure alarm when buffer tank pressure drops below 85 psig.
- Airline couplings shall be incompatible with outlets for other gas systems to prevent inadvertent servicing of airline respirators with non-respirable gases or oxygen.

Below is an example of a Pre-Medical Evaluation form that is utilized by the LHCP. This is to be utilized for instructional purposes only.

			Pre-Medical Evaluation Questionnaire		Date
Last Name		First Name, Middle Initial		SS #	D.O.B.
Weight		Height ft. in.			
Have you ever had or do you now have any of the following? (mark an "X")					
Yes	No	Don't Know	Description	Comments	
			Lung Disease		
			Persistent Cough		
			Shortness of Breath		
			Heart Disease		
			History of Fainting or Seizures		
			High Blood Pressure		
			Diabetes		
			Fear of Close/Tight Places		
			Smothering Sensations		
			Heat Stroke or Heat Exhaustion		
			Ruptured Ear Drum		
			Defective Hearing		
			Wear Corrective Lenses		
			Other Problems With Your Eyes		
			Do You Smoke?		
			Any other conditions that might interfere with the use of a respirator or limit your ability to work? If yes, explain:		
List any medications that you are presently taking:					



Respirator Fit Testing Form

IMPORTANT NOTE: Fit testing will **NOT** be performed without a current medical evaluation, if there is any interference with the respirator's face-to-face-piece seal (i.e., beards/facial hair growth where face and respirator seal).

Employee Name: _____ Employee Number: _____

Job Title: _____ Work Area: _____

Test Date: _____ Test Conductor: _____

Test Location: _____ Supervisor: _____

Respirator Brand/Type/ Model Number: _____

Cartridge/Pre-Filter Type Used: _____

Respirator Size (circle one): S M L XL one-size

Frequency of use (i.e., hours/day, times/month): _____

Expected Physical Workload (circle one): Light Moderate Heavy

High Temperature & Humidity Extremes (circle one): Yes No

Additional Personal Protective Equipment Required: _____

Fit Testing Protocol (circle one below):

Qualitative (QLFT): Bitrex™, Isoamyl Acetate, Irritant Smoke, Saccharin Aerosol

Quantitative (QNFT): Portacount System Other: _____

NOTE: The fit testing methodology used should be described in the written respirator program.

Has a proper face fit been obtained (circle one): Yes No

If at any time you notice that the respirator is damaged, you can taste or smell contaminants, an irritation develops, breathing becomes difficult, or you experience dizziness or distress, please leave the unsafe atmosphere immediately and then remove the respirator. Consult your supervisor immediately. You may have a leak in your respirator, the cartridges may need replacement, or there may be some other problem.

Employee Signature: _____ Date: _____

MONTHLY RESPIRATOR CLEANING & INSPECTION LOG

User name:			Issue date:			Fit test date:			Size: ☐ S ☐ M ☐ M/L ☐ L ☐ Other:				
Respirator Make:		Model:		Manufacture date:			☐ 1/2 mask			☐ Full mask			
Log begin date:				Log end date:									
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Monthly respirator cleaning record													
During cleaning inspect the following items of your respirator	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	
Facepiece free from cracks, tears and dirt?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Facepiece seal area distortion free, material is pliable?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Inhalation valves, including valve seats free from cracks or tearing?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Head straps intact, do they have good elasticity?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
All plastic parts free of signs of cracking or fatigue?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
All gaskets properly seated?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Exhalation valve & seat free from dirt, distortion, cracking, tearing?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Lens free from cracks?(full face mask only)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Lens free from scratches that impede vision?(full face mask only)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Filters within their expiry date?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Is the respirator facepiece less than 5 years old?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Note: If any boxes above are marked ☒ then the mask may have to be replaced. Consult with your supervisor before using the mask again.													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Monthly respirator cartridge/filter check (mark with date changed)													
Supervisor monthly review (initial)													

Notes _____

09/2020

Thompson Electric, Inc.

Exposure Assessment Record

Respiratory Protection Program Administrator: _____

Job: _____ Date: ____ / ____ / ____ (Month / Day / Year)

Location: _____ Job Description: ☐ Routine ☐ Emergency

Describe work performed and length of time involved: _____

Contaminants:

Contaminant	Concentration (Measured or Estimated)	Reference: (Report Number Survey, Sample)	OEL*	Hazard Ratio**

* OEL – Occupational Exposure Limit PEL, TLV, REL, WEEL or other company specified occupational exposure limit.

** The Hazard Ratio is the quotient of the measured or estimated concentration divided by the appropriate occupational exposure limit. Respiratory protection is required if this value is greater than one and all feasible engineering and work practice controls have been implemented to reduce the concentration to as low as possible.

Note: For those contaminants for which respiratory protection is desired, the information from above must be transferred to the Respirator Selection Documentation form.

Respirator Selection Documentation

STEP 1: Respiratory Hazard Identification

- Oxygen Concentration: _____
- Contaminant(s): _____
- Physical State(s): _____
- Concentration: _____

• IDLH Concentration: _____

• Lower Flammable Limit: _____

• Service Life Information: _____

• Chemical Cartridge Changeout Time: _____

STEP 2: Hazard Analysis

- Permissible Exposure Limit: _____
- Protection Factor Needed: _____
- Skin Absorption/Irritation: _____
- Eye Irritation: _____
- Warning Properties
Odor Threshold: _____
- Nose/Throat Irritation: _____

STEP 3: Respirator Type Required

• Minimum Acceptable: _____

• Alternative (optional): _____

STEP 4: Specific Selections

- _____
- _____
- _____
- _____

Qualitative Fit Test Record

Name: _____ Date: ____ / ____ / ____ (Month / Day / Year)

Employee ID/SSN: _____

Respirator: _____ Size: _____

Respiratory Hazards Encountered: _____

Sensitivity Test:

- Isoamyl Acetate (Banana Oil):
- Saccharin #Squeezes:
- Bitter Aerosol #Squeezes:
- Irritant Smoke:

Results:

10 ☐ 20 ☐ 30 ☐

Pass ☐ Fail ☐ NA ☐

Pass ☐ Fail ☐ NA ☐

Pass ☐ Fail ☐ NA ☐

Pass ☐ Fail ☐ NA ☐

Fit Test Agent:

- Isoamyl Acetate
- Saccharin
- Bitter Aerosol
- Irritant Smoke

Filter/Cartridge:

- Organic Vapor Cartridge
- Particulate Filter
- Particulate Filter
- 100 Level Particulate

Filter Results:

Pass ☐ Fail ☐ NA ☐

Pass ☐ Fail ☐ NA ☐

Pass ☐ Fail ☐ NA ☐

Pass ☐ Fail ☐ NA ☐

Comments: _____

Fit Test Repeated Before: _____ Test Conductor: _____ Employee Signature: _____

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	• Origination	Safety Div.	Vice President of Operations	N/A	08/01/12
N/A	• No Changes, Revisions, Additions	Safety Div.	Vice President of Operations	12/28/12	01/31/13
N/A	• No Changes, Revisions, Additions	Safety Div.	Vice President of Operations	05/15/13	01/31/14
01	• Introduction – Updated • Removed MSDS Definitions (outdated) • Replaced Vice President with Vice President of Operations • Added section on “Responsibilities” • Added section on “Voluntary Use of Respirators” • Updated Training Requirements • Updated Respiratory Fit Test Record • Updated Exposure Assessment Record • Updated Respirator Inspection Form to Monthly Cleaning & Inspection Log	Safety Div.	Management w/Safety	09/2020	09/2020



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362



Scaffold Safety

Scaffolds Used in Construction

2021-2022

Introduction

This safety policy and procedure provides guidelines for the safe use of scaffolds by Thompson Electric, Inc. (*herein referred to as TEI*) employees and TEI Sub-Contractor employees. It includes training provisions and guidelines for scaffold erection and use. Additionally, it lists the different types of scaffolds that may be used by Thompson Electric and details general safety requirements for all scaffolds.

This safety policy and its related procedures are established in accordance with OSHA Standards for General Industry (29 CFR 1910.28) and OSHA Standards for Construction Industry (29 CFR 1926.451).

NOTE: Any form of Scaffolding that is not covered in this policy and procedure will be erected, maintained, inspected, unassembled, etc. according to OSHA 1926, Subpart L.

This policy applies to all TEI Divisions and their Sub-contractors. All employees are required to comply with the provisions of this policy and procedure. Any deviation, unless spelled out specifically in the policy, requires the permission of the Vice President of Operations and the Safety Director.

Scaffolds shall be erected, moved, dismantled, and altered only under the supervision of a Competent Person. When scaffolding hazards exist that cannot be eliminated, then engineering practices, administrative practices, safe work practices, Personal Protective Equipment (PPE), and proper training regarding Scaffolds will be implemented.

Definitions

Authorized Scaffold User – One who has been trained on the use of the particular scaffold and who understands the limitations and configuration of that scaffold. Authorized scaffold users may also be deemed Competent Person if they meet the definition as outlined below.

Bearer (putlog) – A horizontal traverse scaffold member upon which the scaffold platform rests and which joins scaffold uprights, posts and similar members.

Brace – A rigid connection that holds one scaffold member in a fixed position with respect to another member or to a building or structure.

Competent Person – One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees and who has the authorization to take prompt corrective measures to eliminate such conditions. Competent Scaffold Persons will be deemed competent as an erector, and inspector, or a combination of the two.

Coupler – A device for locking together the tubes of a tube and coupler scaffold.

Equivalent – Alternate designs, materials or methods to protect against a hazard which Thompson can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the OSHA standard.

Heavy Duty Scaffold – Rated for loading between 51# and 75# per square foot.

Light Duty Scaffold – Rated for loading up to 25# per square foot.

Longitudinal Bracing – Bracing parallel to the long side of the scaffold so the X runs the same direction as the long side of the scaffold.

Maximum Intended Load – The load of all persons, equipment, tools, materials, transmitted loads and other loads reasonably anticipated to be applied to a scaffold or scaffold component at any one time.

Medium Duty Scaffold – Rated for loading between 26# and 50# per square foot.

Qualified Person – One who by possession or a recognized degree, certificate, professional standing or with extensive knowledge, training and experience has successfully demonstrated his or her ability to solve problems related to the subject matter, the work or project.

Runner (ledger or ribbon) – The lengthwise horizontal spacing or bracing member which may support the bearers.

Scaffold – Any temporary elevated work platform.

Traverse Bracing (cross bracing) – Bracing at right angles to the long side of the scaffold so the X is in the interior scaffold space between the parallel uprights.

Responsibilities

Division Management is responsible for:

- Working with Safety on the Annual Review and update of Thompson Electric's, Scaffolding Safety Program.
- Working with Warehouse Management, and Safety, to ensure that all newly purchased, and TEI rented, scaffold comply with this policy and procedure and customer requirements.
- Identifying employees in their division, and Sub-Contractor employees used by their division, that are affected by this safety policy and procedures.
 - Working with Safety to obtain, and coordinate training, for the affected TEI employees in their division (enrolling employees in this program as required).
 - Obtaining, and submitting, proof of training (that meets or exceeds the requirements of this program) for any Sub-Contractor employees used by their division to safety at least 48 hours in advance of any mobilization onto a TEI work site.
- Providing prompt assistance to Project Managers, Estimators, Supervisory Personnel and Scaffold Competent and Qualified Persons on any matter concerning this policy.
- Ensuring that a copy of this policy is included in specifications and contract documentation for work to be performed by subcontractors.

Project Managers are responsible for:

- Providing prompt assistance to Field Supervisory personnel, Competent Persons, Qualified Persons, TEI Sub-Contractor employees, or others on any matter concerning this policy.
- Identifying employees and Sub-Contractor employees used on their work sites, that are affected by this safety policy and procedures.
 - Working with their Division Manager to obtain, and coordinate training, for the affected TEI employees on their assigned work sites.
 - Obtaining, and submitting, proof of training (that meets or exceeds the requirements of this program) for any Sub-Contractor employees used on their work sites to their Division Manager, or Safety, at least 48 hours in advance of any mobilization onto a TEI work site.
- Ensuring that employees are provided with approved PPE as required in TEI's Personal Protective Equipment Policy and TEI's Fall Protection Policy.
- Ensure compliance with this safety policy and procedure through site visits and performance of TEI's Crew Based Safety Observations program.

Supervisory Personnel shall be responsible for the following:

- Supervisors will not allow any TEI employee, or Sub-Contractor employee, who has not received the required training to perform any of the tasks or activities related to scaffold use, erection and/or dismantling.
- Ensuring that all employees wear and utilize PPE and fall protection equipment as assigned and trained.
- Ensuring that a "Competent Person" is in charge of scaffold erection, dismantling, and altering work according to the manufacturer's specifications.
- Ensuring that all required pre-use inspections are performed, and documented, according to this policy.

All Employees, regardless of status, are responsible for:

- Complying with all applicable guidelines contained in this safety policy and procedure.
- Reporting immediately damaged scaffolds, accessories, and missing or lost components to the Supervisor and/or Competent Person.
- Employees will assist with inspections as requested.

The Competent Person will:

- Have primary responsibility for supervising and directing all scaffold erection, dismantling, and altering work.
- Be able to identify and correct hazards encountered in all assigned scaffold work.
- Be trained in the structural integrity of the types of scaffolds used by TEI and its Sub-Contractors.
- **Have complete authority to promptly abate any hazardous worksite conditions.**
- The Competent Person's duties can be shared as long as each person is qualified to perform the duty and has **authority** to promptly abate hazards. However, **only a Competent Person can...**
 - Determine feasible safe access for persons erecting and dismantling scaffolds;
 - **Inspect scaffolds and components for hazards before each work shift and after any event that could affect the scaffolds' structural integrity;**
 - Supervise and direct all scaffold erection, dismantling, and altering work;
 - Determine the feasibility of providing fall protection for each scaffold erection and dismantling operation;
 - Determine whether it is safe to work on scaffolds during storms or high winds. Rather than setting a specific wind speed limit, OSHA's standard directs the Competent Person, after analysis of all pertinent information, to ensure that the scaffold is safe under high wind conditions that protective measures have been instituted, and that work may safely be done from the scaffold.
 - Determine whether scaffold components made by different manufacturers can be used together;
 - Identify the cause and significance of a deteriorated scaffold component and correct the hazard;
 - Inspect ropes used in suspension scaffolds and identify defects;
 - Determine if multi-point suspension scaffolds need to be secured to prevent swaying; and

The Qualified Person:

- Has a recognized degree, certificate, or professional standing – or by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve problems related to the subject, the work, or the project.
- Scaffolds must be designed by a qualified person but not necessarily by an engineer. Exceptions which must be designed by a registered professional engineer consist of:
 - Connections for mason's adjustable multi-point suspension scaffolds;
 - Pole scaffolds more than 60 feet high;
 - Coupler and fabricated-frame scaffolds more than 125 feet high; and
 - Outrigger scaffolds.

Training

All TEI employees, and Sub-Contractor employees, who utilize scaffolds on their work sites shall receive, at a minimum, training as outlined below:

Summary of Training Requirements For Scaffold Users		
	Those who work from scaffolds	Those Who Erect & Dismantle scaffolds
Critical Scaffold Issues	- Falling objects - Fall protection - Material handling on scaffolds - Scaffold load capacities	- Scaffold design criteria - Scaffold erecting disassembling, moving, and maintenance procedures - Scaffold erecting, disassembling and, moving hazards - Scaffold load capacities
What they Need to know	- How to use appropriate fall protection systems. - How to control scaffold hazards. - How to use scaffold walkways, platform components, and access areas. - Maximum-intended and load-carrying capacities of scaffolds	- Hazards involved in erecting/dismantling. - Erection/dismantling procedures. - How to deal with electrical hazards. - How to inspect components. - Appropriate design criteria. - Maximum-intended and load-carrying capacities of scaffolds.
Who can Train them	- Any person who has training and experience in the critical scaffold issues (above) and who can teach the issues to scaffold users. - Any "Qualified Person" as described in this policy and procedure.	- Any person who has training and experience in the critical scaffold issues (above), who can teach the issues to erectors/dismantlers, and who has authority to control scaffold hazards. - Any "Competent Person" as described in this policy and procedure.
How often to train & retrain them	- Before they begin a new job. - Whenever changes at the worksite present new hazards. - Whenever they fail to demonstrate skills related to any of the critical scaffold issues.	- Before they begin a new job. - Whenever changes at the worksite present new hazards. - Whenever they fail to demonstrate skills related to any of the critical scaffold issues.

This training shall be done upon initial job assignment. Refresher training shall be provided when job conditions change. Periodic refresher training shall be done at the discretion of Safety, the Project Manager, TEI Customer request, Competent Person and/or work site Supervisor.

Training for the Competent Person will consist of:

- OSHA Regulations/General Safety - Frame Scaffolding Components - Frame Scaffolding Erection - Rolling Tower Scaffold Erection - Scaffold Planking	- Tube & Clamp Scaffolding - Systems Scaffolding - Scaffold Inspections - Electrical Hazards - Material Handling Hazards

Planning the Activity

- Survey the jobsite or work area before each activity to determine ground conditions, strength of structures, and general site conditions such as weather, overhead obstructions, power lines, and other work activities.
- Order scaffolding that best fits the work scope requirements.
- Upon delivery inspect all scaffolding and check for:
 - Excessive rust and metal fatigue
 - Straightness of members and weld integrity
 - Inspect coupling pins for alignment and locking devices on frames/braces
 - Inspect center pivot on cross braces
 - Inspect caster brakes
 - All required pieces are present including manufacturers erection and user instructions
 - Immediately red tag any defective pieces and notify the Field Superintendent
- Remember Fall Protection and order PPE and PFAS components appropriately – The 100% tie-off policy is in effect while scaffolding is being erected or dismantled. The Competent Person must determine proper fall protection including anchorage points. As a last resort the Competent Person may authorize tie off to scaffold components, however only to structural members of the scaffold.
- General rules and safety tips must be followed for scaffold and work platform assembly and dismantling.
- An authorized Competent Person must inspect and tag the scaffolding as safe to use (green tag), safe to use with tie off (yellow tag), or Do Not Use – Incomplete (red tag).
 - Employees will not utilize any untagged scaffold until the Competent Person has reviewed the scaffold for any unsafe conditions and tagged as described above.

Types of Scaffolding

Listed below are some of the common types of scaffolding that may be utilized by properly trained and authorized TEI employees.

- Fabricated Frame Scaffold (tubular welded frame scaffold) – A scaffold consisting of a platform(s) supported on fabricated end frames with integral posts, horizontal bearers, and intermediate members.
- Quick Erect Scaffolds – A type of system scaffold designed to be fast, easy to erect and dismantle.
- Mobile Scaffolds – A powered or unpowered, portable, caster or wheel-mounted supported scaffold.
- Supported Scaffold – A scaffold consisting of posts with fixed connection points that accepts runners, bearers, and diagonals that can be interconnected at predetermined levels.
- System Scaffold – A scaffold consisting of posts with fixed connection points that accepts runners, bearers, and diagonals that can be interconnected at predetermined levels.
- Tube and Coupler Scaffolds – A supported or suspended scaffold consisting of a platform(s) supported by tubing, erected with coupling devices connecting uprights, braces, bearers, and runners.

General Requirements for all Scaffolds

The general requirements listed in this section may not be all inclusive and you should refer to OSHA Standards 29 CFR 1926.450 through 454 for additional requirements. The manufacturer's erection and user instructions must be available on each project for each type and brand of scaffold that will be used.

Capacity

- Each scaffold must support own weight and 4 times the maximum intended load.
- Suspension ropes and hardware must support 6 times the maximum intended load.

Scaffold Platform Construction

- Platforms must be fully planked or decked with no more than 1 inch gaps or more than 9½ inches where it is demonstrated by a Competent Person additional space is needed between the platform and the uprights.
- Scaffold platforms and walkways shall be at least 18 inches wide unless determined impossible by a Competent Person and would require standard guard rail system or 100% tie-off.
- The front edge of all platforms must be no more than 14 inches from the face of work except for plastering and lathing operations where no more than 18 inches is allowed.
- Platforms 10 feet and less in length must extend at least 6 inches but not more than 12 inches past supports unless designed and installed and/or guarded properly.
- Platforms longer than ten feet may extend up to 18 inches past support. Platform extensions over 18 inches require proper design, installation, and/or guarding.
- Overlap platforms must extend more than 12 inches over supports unless restrained to prevent movement.
- Each abutted end of planks shall rest on a separate support surface.
- On direction changes, any platform on a bearer at other than a right angle shall be laid first, and platforms which rest at right angles over the same bearer laid next.
- The top and bottom of wood platforms shall not be covered with opaque finishes. You must be able to see the wood grain through any finish.
- Properly sized nails/bolts/wire will be used to secure planks, and railings. All nails will be driven to full length in a non-straight pull configuration.
- Mixing different manufactured scaffold components must be approved by a Competent Person and compatibility and integrity of components must be maintained.
- All scaffolding shall have a safe means of access, using hook-on/attachable, stairway type ladders, stair towers, or the equivalent.
- Scaffold components may be modified provided a Competent Person determines structural integrity is maintained.
- Scaffold components of dissimilar metals cannot be mixed unless approved by a Competent Person.
- Before scaffold is used, the connections shall be inspected by a Competent Person and the scaffold appropriately tagged (i.e., green for no restrictions, yellow for restrictions which must be listed on the back of the tag, or red for incomplete no use).



Specific Scaffold Requirements

Criteria for Supported (Frame) Scaffolds

- The first guys, ties, and braces shall be installed when the vertical height is four times the minimum base dimension and then every twenty feet thereafter for platforms 3' wide or less and every 26' thereafter for platforms more than 3' wide.
- Guys, ties, and braces shall be installed at each end and horizontally not more than 30 feet apart.
- Supported scaffolds must be plumbed and adequately braced.
- Bracing must be installed as close as possible to the intersection of the bearer, and post, runner, and post.
- Transverse (cross) bracing shall be installed across the width of the scaffold every 3rd set of posts horizontally, every 4th runner vertically and at scaffold ends.
- Longitudinal bracing shall be installed at approximately a 45 degree angle from the base of the first outer post to the extreme top of the scaffold. Longitudinal bracing must be repeated at every 5th post on continuous running scaffolds.
- Scaffold poles, legs, posts, frames and uprights must bear on base plates or other adequate firm foundations. Base plates are required at a minimum. Mudsills are also required unless on an adequate firm foundation (such as a concrete floor).
- Fabricated frame scaffolds, tube, and coupler scaffolds over 125 feet high shall be outsourced by Thompson Electric to a registered professional engineer.
- Building ties must be installed at bearer levels.
- Tube and coupler scaffolds must have positive locking type pins.
- Runners shall be located as close to the base as possible, interlocked to form continuous lengths, and coupled to each post.

Criteria for Suspension Scaffolds

- Support devices shall be capable of supporting at least four times the load imposed.
- Outrigger beams when used, shall be structural metal or equivalent and restrained against movement.
- Inboard ends of suspension beams shall be stabilized by bolts or other direct connections to the floor or roof deck and evaluated by a Competent Person.
- Suspension rope on winding drum hoists shall not contain less than four wraps of rope at the lowest point of scaffold travel. Suspension ropes used with other types of hoists shall have a designed/provided means to prevent the rope end from passing through the hoist.
- The use of repaired or damaged rope is prohibited.
- Ropes shall be inspected by a Competent Person prior to each work shift and after any occurrence possibly affecting a rope's integrity.
- Gasoline powered equipment and hoists shall not be used.
- Braking devices shall be automatic when an instantaneous change in momentum, or accelerated over speed occurs.
- Manually operated hoists require positive crank force to descend.
- Two-point and multi-point scaffolds shall be tied or secured otherwise to prevent from swaying and inspected by a Competent Person.
- Devices whose sole function is to provide emergency escape and rescue shall not be used as working platforms.

Criteria for **Mobile Scaffolds**

- Shall be braced by cross, horizontal or diagonal braces to prevent racking or collapse and to automatically square and align the vertical members.
- Shall have all brace connections secured and shall be plumb, level and square.
- Scaffold casters/wheels shall be equipped with positive locking devices to prevent movement while in use.
- Manual force used to move the scaffold shall be applied as close to the base as possible and no higher than five feet.
- Only power systems designed to move mobile scaffolds shall be used. Do not use forklifts, trucks, etc.
- Employees shall not be allowed to ride on scaffolds.
- Platforms shall not extend outward beyond the base supports unless outrigger frames or equivalent devices are used.
- Caster stems and wheel stems shall be pinned or positively secured to scaffold legs.
- Note: Height to base width of the scaffold during movement is 2:1 or less unless specifically designed and constructed to exceed nationally recognized stability test requirements.

General

- Reference 1926.452 for additional requirements applicable to the specific type of scaffold you are going to use.

Scaffold Access and Ladders

When scaffold platforms are more than two feet above or below a point of access, portable, hook-on or attachable ladders, stair towers, stairway-type ladders, ramps, walkways, integral pre-fabricated scaffold access, or direct access from another scaffold, structure, personnel hoist or similar surface shall be used.

- An opening in the railing or perimeter barrier must be provided with a swing gate, if feasible, at each access point.
- Climbing over railing shall be prohibited as a means of access. The swing gate will be the access closure of choice.
- If a swing gate cannot be used, then a THA/JHA (performed by a Qualified Person or Competent Person) is required to identify how to access the location safely and requires approval from the Field Superintendent.
- Do not use cross-braces or framed corners as means of access.
- Access must be provided to all working levels of a scaffold.

Hook-on and Attachable Ladders

- Shall be positioned as not to tip scaffold.
- The ladder bottom rung shall not be more than 24 inches above the scaffold supporting level.
- Ladders extending more than 35 feet high shall have rest platforms at 35 foot maximum vertical intervals.
- Ladders shall be specifically designed for use with the type of scaffold used.
- Minimum rung length of 11½ inches, uniformly spaced with a maximum spacing between rungs of 16¾ inches.

Stairway Type Ladders

- The bottom step shall not be more than 24 inches above the scaffold supporting level.
- Rest platforms shall be provided at 12 foot maximum vertical intervals.
- Minimum step width of 16 inches (mobile stairway-type ladders may have minimum step width of 11.5 inches).
- Treads and landings must be slip resistant.

Stair Towers

- The bottom step shall not be more than 24 inches above scaffold supporting level.
- Handrails shall be provided at all levels with adequate hand hold for user grasping, surface smooth (free of objects which could puncture), at least three inches from other objects, and at least 28 to 37 inches high from the surface of the tread.
- Landing platforms at least 18 inches wide by 18 inches long at each level.
- Stairway between stair rails shall be at least 18 inches wide.
- Treads and landings have slip resistant surfaces.
- Stairways shall be installed between 40 and 60 degrees from horizontal.
- Riser height and tread depth shall be uniform within ¼ inch.
- Stair towers are preferred over ladders for access to different levels.

Ramps and Walkways

- 6 feet or more above lower levels shall have guardrail systems that comply with sub-part M of the OSHA Standard (Fall Protection).
- Slope of ramp or walkway shall not be inclined more than one vertical to three horizontal (or 20 degrees above the horizontal).
- Slopes more than 20 degrees shall have cleats not more than 14 inches apart securely fastened.

Pre-fabricated End Frame Access

- Must be specifically designed and constructed for use as ladder rungs.
- Ladder rung length must be at least 8 inches wide, maximum spacing between rungs not to exceed 16¾ inches and uniformly spaced.
- Ladder must be free from obstructions such as scaffold planks extending over the end of the scaffold.
- Rest platforms must be provided every 35 feet.

Access for employees erecting or dismantling supported scaffolds

- A safe means of access shall be provided for each employee erecting or dismantling a scaffold.
- Hook on attachable ladders shall be installed as soon as scaffold erection has progressed to a point that permits safe installation and use.
- Tubular welded frame scaffold and frames with horizontal members that are parallel, level and not more than 22 inches apart vertically, may be used for access.
- Cross braces on tubular welded frame scaffolds shall not be used for access.

Scaffold Use

Scaffolds and scaffold components shall be inspected by a Competent Person before each work shift, throughout the shift, and after any occurrence resulting in possible damage to the scaffold.

- A General Scaffold Inspection Checklist shall be completed by the Competent Person.
- A green, yellow, or red scaffold tag shall be placed at all points of access to the scaffold.

General Scaffold Inspection Checklist		
Date:	Job Site/Location:	
Footings	Bracing	Planking/Picks
Soft & Uneven	Façade & Ledger	Bad Boards
No Base Plates	Some Missing	Trap Boards
No Mud Sills	Loose	Incomplete Boarding
Undermined	Wrong Fittings	Insufficient Supports
Satisfactory	Satisfactory	Satisfactory
Standards	Couplings	Guard Rails & Toe Boards
Not Plumb	Wrong Fittings	Wrong Height
Joined At Same Height	Loose	Some Missing
Wrong Spacing	Damaged	Loose
Damaged	No Check Couplers	Damaged
Satisfactory	Satisfactory	Satisfactory
Ledgers	Ties/Guys & Kickers	Ladders
Not Level	Some Missing	Insufficient Length
Joined In Same Bays	Loose	Not Tied
Loose	Damaged	Damaged
Damaged	Other	Other
Satisfactory	Satisfactory	Satisfactory
Comments:		
Inspected By:		Position:
Signature:		Date Of Inspection:

General Requirements/Guidelines (*not all inclusive – Consult a Competent Person*)

- The use of shore or lean-to scaffolds is prohibited.
- Never overload scaffold components beyond their rated capacity.
- Scaffolds shall not be moved horizontally with employees on them.
- Clearance between power lines
 - Insulated Lines
 - <300 volts → 3 feet minimum
 - 300 volts to 50 kV → 10 feet minimum
 - > 50 kV → 10 feet minimum plus 4.0 inches per 1 kV > 50 kV
 - Uninsulated Lines
 - < 50 kV → 10 feet minimum
 - > 50 kV → 10 feet minimum plus 4.0 inches per 1 kV > 50 kV
 - NOTE: Clearance closer than the above requirements is possible if a Qualified Individual coordinates the accomplishment of the following:
 - Lines are de-energized and grounded
 - Lines are relocated
 - Lines have installed insulated protective covers
 - Lines are of the insulated, armored, shielded cable type
 - Permission has been received (in writing) from the Division Manager and Safety.
- Scaffolds shall be erected, moved, dismantled or altered only under the supervision and direction of a Competent Person and these activities shall be performed only by experienced and trained employees selected for such work by the Competent Person.
- Employees are prohibited from working on scaffolds covered with slippery materials such as ice, snow, oils, except as necessary for the removal of such materials. The removal of these materials must be performed under the guidance of a Competent Person.
- Suspension ropes shall be protected from heat sources or corrosive substances.
- It will be the determination of the Competent Person and manufacturer whether scaffold components can be altered.
- Scaffold work is prohibited during storms or high winds unless a Competent Person determines it is safe.
 - The practice of covering scaffolds with plastic, etc. increases the wind load on a scaffold dramatically and must be evaluated by a Competent Person.
- Debris cannot accumulate on the platform. Regular and frequent housekeeping/clean-up is required.
- Makeshift devices shall not be used on top of scaffold platforms to increase height for scaffold users.

Fall Protection

Each employee on a scaffold more than ten feet above a lower level shall be protected from falling to that lower level.

- Each employee on a boatswain's chair, catenary, needle beam, or ladder jack scaffold shall be protected with a personal fall arrest system.
- Each employee on a single-point or two-point adjustable suspension scaffold shall be protected by both a personal fall arrest system and a guardrail system.
- A Competent Person shall determine the fall protection/prevention requirements needed for erecting or dismantling scaffolding > 6 feet. As a last resort the Competent Person may authorize tie off to structural members of the scaffolding. A personal fall arrest system shall be used unless a complete fall prevention system is in place.

- Vertical lifelines used for fall protection shall be anchored to a fixed point ***independent*** of the suspended scaffold anchor point. Safe anchorage points include structural members of a building and ***not*** stand pipes, vents, piping systems, electrical conduit, outrigger beams, or counter weights.
- Scaffolding top rails manufactured after January 1, 2000 must be 38 inches to 45 inches high.
- It is unacceptable to use cross bracing in lieu of top or mid rails on scaffolding.
- A Competent Person must determine adequate tie off points while erecting, dismantling, or using a scaffold. Tying off to the scaffold is the last resort. The scaffold must be secured from tipping by guying, bracing, etc., ***before*** using it as an anchorage point.

Falling Objects Protection

- Protection from falling objects shall be provided by the use of toe boards, screens, guardrail system, debris nets, catch platforms, canopy structures, or deflecting devices.
- Areas below scaffold where objects could fall shall be barricaded off unless scaffold edges/sides can be adequately protected with toe boards and/or paneling/screening provided along scaffolding sides.
- Canopies, debris nets, or catch platforms with sufficient strength to withstand impact forces expected can be used over team members working below for protection.

Scaffold Tagging

- A Competent Person is required to monitor and be responsible for all scaffolding use activities. The Competent Person shall be responsible for affixing a tag to each scaffold that identifies the status of use.
 - **Red tag** – Indicates that the “Scaffold” is incomplete or uninspected: **“DO NOT USE!”**
 - **Yellow tag** – Indicates that the “Scaffold” has been inspected and is safe to use, but requires **100% TIE OFF!**
 - **Green tag** – Indicates that the “Scaffold” has been inspected and is safe to use with **NO RESTRICTIONS.**
- Each tag will reflect the Competent Person’s name and date when tag was fixed. Each day the scaffold is to be used, the Competent Person must inspect the scaffold and initial and date and tag.
- Do not use any scaffold that has not been tagged to reflect use instructions or has not been inspected by a Competent Person for the day and shift you plan to use it.



Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
	Origination	Safety Div.	Vice President		08/01/12
01	Updated Competent Person Training Requirements Section	Safety Div.	Vice President	12/28/12	01/31/13
N/A	No Changes, Revisions, Additions	Safety Div.	Vice President	05/15/13	01/31/14
02	- Added in introduction that any deviations from policy require permission of Vice President of Operations & Safety Director - Removed the Vice President's Duties - Updated responsibilities of Division Managers & Project Managers - Clarified that all "Rented" scaffolds must meet the requirements of this program - Inserted examples of scaffold "Tags" as described	Safety Div.	Management w/Safety	09/2020	09/2020
03	- Updated Training section - Updated Tagging section - Corrected fall protection requirements - Fixed grammatical errors	Safety Div.	Management w/Safety	12/2021	12/2021



Thompson Electric, Inc.

49 Northmoreland Avenue | Munroe Falls, Ohio 44262

(330) 686-2300 | F (330) 686-2362

Stop Work Authority Written Program

Pausing Work

TEI PROGRAM SAFETY-025 Stop Work Authority R2 202507

Introduction

1. The Thompson Electric, Inc. (TEI) Stop Work Authority (SWA) program establishes the authority and obligation of any and all TEI employees to suspend a single work task or group operation when the control of Health, Safety and Environmental risk, great or small, is not clearly established or understood. This program and its related procedures are based on the following fundamental values of TEI's Safety Philosophy:
 - a. Safety is a value not only to TEI, but our customers and members of the public. Because of this TEI employees are endowed with Stop Work Authority and are expected to use it whenever a condition or act is believed to be unsafe.
 - b. Each employee is responsible for their own safety – employees are not to expose themselves to unmitigated risks.
 - c. Each employee is responsible for their co-worker's safety. TEI employees are "Our Brother's and Sister's Keeper". Employees are not to allow co-workers to take unmitigated risks.
 - d. Employees are responsible for reporting all safety incidents, regardless of severity, to their immediate supervisor. The near miss reported today could prevent an accident or incident tomorrow.
 - e. All safety concerns are to be reported to Foreman, Supervisor, Safety Department, Fleet Manager or Division Manager. Concerns may be elevated through any other available avenues within the organization.

Policy Statement

1. Employees and contractors of TEI are authorized, empowered, and obligated to stop any job in which unsafe conditions, behaviors, or activities prevail, regardless of real or perceived severity of the risk exposure. No employee or contractor will incur retribution of any sort for stopping a job due to safety reasons.

Responsibilities

1. Executive Leadership and Division Managers
 - a. Establish the clear expectation to exercise SWA any time the amount of risk is perceived to pass an acceptable threshold.
 - b. Promote commitment to create a culture where SWA is exercised freely.
 - c. Resolve SWA conflicts when they arise and hold accountable those who chose not to comply with TEI's established SWA program.
 - d. Support prompt resolution of issues stemming from the execution of stop work authority by dedicating the resources required for investigation, corrective action implementation, and communication of the occurrence and its result.
 - e. Provide feedback and approval of revisions to this program.
2. TEI Safety
 - a. Foster a culture where SWA is exercised freely.
 - b. Assist in resolution of issues before operations resume.
 - c. Recognize participation and ensure that all uses of SWA are properly reported with any follow-up completed, documented, and lessons learned shared across TEI.

- d. Assist employees, supervision, and management in the resolution of safety issues and concerns.
 - e. Immediately contact management and work to resolve issues when an employee has called a situation to their attention that has not been resolved.
 - f. Discuss resolution with employees involved in a work stoppage where resolution was completed after their shift, when they were unavailable, or where he/she acted as their representative in reaching resolution.
 - g. Work as the agent of an employee that prefers to remain anonymous in the resolution of the issue.
- 3. Project Managers & Supervisory Personnel
 - a. Maintain a culture where SWA is exercised freely.
 - b. Honor all requests to stop work.
 - c. Resolve issues before operations resume whenever possible. Seek assistance from division management and/or TEI Safety in achieving a resolution as needed.
 - d. Provide feedback on any resolution to individuals and affected work groups who have exercised their SWA.
 - e. Notify Senior Management of any Stop Work issue that is not resolved immediately for instruction and guidance.
 - f. Ensure no actions are taken as reprisal or retribution against individuals who raise safety concerns or stop an activity they believe is unsafe.
- 4. Employees
 - a. Utilize SWA immediately, without fear of reprisal when a situation exists which places their selves, a coworker(s), members of the general public, or the environment in danger or faced with unmitigated risks.
 - b. Notify their supervisor if a raised Stop Work issue has not been resolved to their satisfaction through established channels prior to the resumption of work. Alternatively, contact TEI Safety or Senior Management with any concerns in regard to this program.
- 5. TEI Sub-Contractors
 - a. Have the same responsibility and authority as TEI employees to Stop Work.
 - b. If SWA is exercised, immediately notify a TEI representative that:
 - i. Work has stopped; and
 - ii. The reasons for stopping work.
 - c. Work with TEI to resolve any issues.
 - d. Reach a consensus to resume work.

Training

- 1. SWA training shall be included in all new hire onboarding.
- 2. Training shall cover the following topics:
 - a. What SWA is;
 - b. Who has SWA;
 - c. Why SWA is important;
 - d. When to use SWA;
 - e. What to do if SWA isn't recognized or the issue couldn't be resolved immediately; and
 - f. How to document SWA use as a good catch/near miss.

3. Records of training will be stored and tracked in the Safety Evolution platform.
4. Refresher training will be delivered based on the following criteria:
 - a. Changes made to the program;
 - b. Demonstrated lack of skills and/or knowledge in the use of SWA; and,
 - c. At regular intervals deemed appropriate by TEI Executive Leadership.

Procedures

1. SWA is expected to be exercised in the following circumstances:
 - a. An upset condition exists;
 - b. An unsafe act is occurring, about to occur, or already occurred;
 - c. Deviation in work scope from original work plan/THA;
 - d. If uncomfortable or unfamiliar with performing a specific task;
 - e. Unclear of or unsure of instructions;
 - f. Any scenario in which anyone is exposed to unmitigated risk or hazards; and
 - g. Any other instances in which there is a perceived unsafe condition, act, error, omission, or lack of understanding that could result in an undesirable event.
2. If the affected person(s) are in immediate risk, the Stop Work intervention should be initiated directly with those at risk and then the Supervisor contacted immediately following the stoppage.
 - a. If the Supervisor is readily available and the Affected Person(s) are not in immediate risk, the Stop Work procedure should be coordinated through the Supervisor.
3. Work stoppage is not required to be performed with a specific phrase or activity; stoppages will vary based on the specific circumstances in each occurrence.
4. Foremen should be notified as soon as safely possible that there has been a use of SWA.
 - a. The foreman will gather all affected parties and facilitate an acceptable resolution.
 - i. Foremen will contact TEI Safety for additional guidance as necessary.
 - b. In some instances, the foreman will be notified of the result of the use of SWA.
5. Upon resolution of a SWA concern, a near miss/good catch will be submitted by the foreman to document the occurrence, solution, and reward the use of SWA.
6. SWA resolutions are encouraged to be reached without management intervention as much as possible.
 - a. TEI Safety, general foremen, division managers, or executive leadership will always facilitate a resolution as needed.
7. In accordance with TEI Employment Policies, retaliation of any kind in response to the use of SWA is strictly forbidden and will be addressed as outlined in the relevant TEI Employment Policies.



Thompson Electric, Inc.

49 Northmoreland Avenue | Munroe Falls, Ohio 44262

(330) 686-2300 | F (330) 686-2362

Subcontractor Prequalification

Written Program

**TEI PROGRAM SAFETY-031 Subcontractor Prequalification R3
202508**

1. Introduction

- a. This written program and its related questionnaire have been established by Thompson Electric, Inc. (herein referred to as TEI) as a means of governing the subcontractor management and approval process. It is intended to supplement all existing applicable laws, rules, regulations and site specific (i.e., customer) policies.
- b. The purpose of this document is to define the requirements and provide guidelines for the assessment of the risk assumed by TEI based on the evaluation of the health and safety performance of potential subcontractors.
- c. The objectives of this guideline are to ensure the health and safety of all workers, prevent losses, ensure TEI's risk is controlled to an acceptable level, and maintain compliance with all rules, regulations and customer requirements on TEI jobsites.
- d. For purposes of this policy a "subcontractor" is defined as being a company or person contracted to provide, and receiving payment for, physical work completed on TEI jobsites, under the direction of TEI.
 - i. Companies providing programming, transport of materials, or otherwise not performing work but providing goods or services are considered to be "vendors" and not subject to the prequalification process.
- e. Based on region and/or customer specific requirements, TEI reserves the right to modify or supplement any aspect of this policy as needed/per project. However, this written program and its requirements shall always be the minimum required.

2. Policy

- a. TEI recognizes that subcontractors perform myriad tasks that expose them to varying degrees of risk.
- b. This program includes ensuring that risks are minimized, when subcontractors are engaged, by diligent application of proven standards of risk management policies, work processes, systems, and procedures which fully integrate health and safety evaluation, planning and design.
- c. TEI requires all contractors to commit to and abide by these standards to maintain superior levels of health and safety performance.
- d. The scope of this policy includes all subcontractors that perform work on any TEI work site or property, or on the behalf of TEI. The scope specifically applies to the prequalification, selection, monitoring, evaluation, and administration of health and safety capability and performance of subcontractors.

3. Subcontractor Qualification

- a. A review of the health and safety performance of a subcontractor must occur prior to TEI entering any working agreement with any subcontractor.
 - i. The [Safety Qualification Questionnaire](#) must be completed by the subcontractor and relevant documentation submitted for review by TEI Safety before any contract is signed.
- b. When TEI Operations determine a subcontractor is needed, a Subcontractor Information Form (<https://forms.gle/NFXpnX9EwpPtqPKd9>) must be completed to notify the Subcontractor Approval Team.
 - i. The form will provide pertinent information necessary to determine all job requirements to be considered during the review process.
 - ii. This form will not be required for annual renewals.
 1. The list of subcontractors from the previous year will be distributed to TEI Operations prior to initiating the annual renewal process to verify the contractors that will automatically be invited to renew.

- c. The subcontractor will be notified of the approval process and its requirements prior to submitting a bid.
- d. Tiered subcontractors (subcontractors of TEI's subcontractors) must all be approved through this qualification process prior to conducting work on any TEI project.
- e. Qualification shall be reviewed, at a minimum, annually, beginning in February of the new year.
- f. Failure to complete this process will result in the following:
 - i. Subcontractor shall not be validated in Spectrum as an approved subcontractor, and;
 - ii. Subcontractor shall not be paid for work completed until qualification process is completed.

4. **Qualification Requirements**

- a. Subcontractors shall be subject to the following evaluation criteria:
 - i. Written Safety Program,
 - 1. Must provide evidence that:
 - a. They have a safety program, and;
 - b. The safety program, at a minimum, includes all topics relevant to the type of work the company performs.
 - ii. OSHA Incident Rates,
 - 1. Must provide the total recordable incident rate (TRIR) for the past 3 years, as well as the data required to make the calculation,
 - a. Must include the current year's data and rate if the questionnaire is being completed after April 1st, and;
 - b. For approval, the 3-year average for TRIR must be below the industry average provided by the Bureau of Labor Statistics for the subcontractor's NAICS code.
 - 2. Must provide the days away, restricted, or transferred rate (DART) for the past 3 years, as well as the data required to make the calculation.
 - a. Must include the current year's data and rate if the questionnaire is being completed after April 1st, and;
 - b. For approval, the 3-year average for DART must be below the industry average provided by the Bureau of Labor Statistics for the subcontractor's NAICS code.
 - iii. Experience Modification Rate (EMR)
 - 1. Must provide current and previous 3-year's EMR and verification thereof in the form of:
 - a. Endorsement page from policy listing EMR,
 - b. EMR report from Ohio Bureau of Workers' Compensation (BWC), or;
 - c. Insurance carrier, broker, or third-party administrator provided rates on their letterhead.
 - iv. Fatalities and Regulatory Citations
 - 1. Fatalities, Willful and/or Repeat violations will be grounds for immediate disqualification.
 - 2. Exemptions can be made at the discretion of the VP of Operations and will require the following documentation for consideration:
 - a. Must provide valid explanation of and remediation plan for any

- workplace fatalities within the past 3-years,
 - b. Must provide standards for which a regulatory body i.e., OSHA, EPA, MSHA, etc. issued citations in the past 3-years as well as a corrective action plan for each citation.
- v. Drug Testing
 - 1. Must have an active and enforced drug testing program.
 - 2. Must comply with any testing requirements TEI's customers may have in place.
 - 3. If the project for which the subcontractor is meant to work is funded by in any amount by the State of Ohio, the subcontractor must be an active participant in the Ohio Bureau of Workers' Compensation's Substance Use Prevention and Recovery Program.
- vi. Processes
 - 1. New hire orientation
 - a. Must have a program for onboarding and communicating hazards to new employees.
 - 2. Pre-job hazard analysis
 - a. Must have a process for conducting and completing pre-job hazard analysis daily, prior to starting work.
 - i. If no process in place, must participate in TEI crew's daily THA procedure.
 - b. Must coordinate with TEI to ensure all hazards are identified and controlled.
 - 3. Training
 - a. Must provide proof of safety training.
 - i. Sign-in sheet, certificates, etc.
 - b. Must provide proof of customer specific training.
 - i. AEP, Bridgestone, FE, etc.
- vii. Miscellaneous
 - 1. Additional documentation
 - a. Must provide additional/supporting documentation as requested.
 - b. TEI reserves the right to re-evaluate any contractor at any time based on new information received that may contradict previous evaluations.
 - 2. Submission quality
 - a. The quality of the submission will be considered in the approval process and may be the determining factor when a contractor's approval is in question.
 - i. Quality refers to organization, accuracy, responsiveness, and professionalism.

5. Outcomes of Subcontractor Review

- a. Approval
 - i. Approval of the safety questionnaire may be issued by TEI Safety if all of the requirements are met by the initial submission.
 - ii. If the initial submission is rejected or additional information is needed, the reviewing Safety Manager will respond to the submitter and requester to explain the deficiencies. Once the contractor corrects and/or supplies additional

documentation, safety questionnaire approval may be issued by TEI Safety.

b. Conditional Approval

- i. In the event a subcontractor fails to meet all of the requirements for approval, they may be conditionally approved at the discretion of the reviewing Safety Manager.

- 1. The reviewing Safety Manager will provide the criteria under which the subcontractor will be allowed to work.
 - a. TEI Safety onsite, only permitted to perform specific tasks or work scope, one-time use, etc.

c. Rejection

- i. If the contractor's submission fails to meet the requirements outlined within this document they will be rejected and barred from performing work for TEI.

- 1. TEI Safety will provide reasonable guidance and feedback to aid a contractor in meeting requirements.
 - a. Uncooperative/combative contractors, severely deficient contractors, uncommitted contractors, and contractors otherwise deemed to be unreceptive to assistance shall be outright rejected.
 - 2. Conditional approval may be offered if the contractor is receptive to assistance and commits to improvement.
 - 3. TEI Safety will make a concerted effort to assist contractors that do not meet approval requirements. However, the objective is to limit the risk assumed by TEI when engaging the services of a subcontractor which may result in outright rejection.

6. Exemptions

- a. When unable to meet TEI's health and safety criteria, due to size or availability, it is possible to offer a subcontractor conditional acceptance.
- b. Conditional acceptance shall have a specific time period and additional requirements or controls implemented appropriate to the level of risk in the work to be performed.
- c. If a subcontractor or TEI Operations employee disagrees with TEI Safety's decision, a formal request must be submitted to TEI's VP of Operations and the TEI Safety Director.
 - i. The VP of Operations and Safety Director will conduct a review of the scenario with all involved parties.
- d. The VP of Operations may overrule a rejection by the reviewing Safety Manager at their discretion.
 - i. All evidence must be reviewed and the risks must be clearly defined before a rejection is to be overruled.

Revision Number	Description of Changes	Written By	Approved By	Revision Date	Effective Date
0	• Origination	Safety Div.	Vice President		08/01/12
01	• None	Safety Div.	Vice President	12/28/12	06/01/13
02	• Clarified all contractors (including tiered subcontractors must have a TRIR equal or lower to the industry average)	Safety Div.	Safety Director	12/31/19	01/31/2020
03	• Major revision to format and content • All changes detailed in "Annual Changes" document	Mike Tortorella	Steve Calcei	8/18/2025	8/18/2025



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262
(330) 686-2300 F (330) 686-2362



Hand & Power Tool Safety
(Including Abrasive Grinding Wheels)

2021-2022

Introduction

Use of tools makes many tasks easier. However, the same tools that assist us, if improperly used or maintained, can create significant hazards in our work areas. Thompson Electric employees who use tools must be properly trained to use, adjust, store and maintain tools properly. This policy and procedure covers hand, electrical, pneumatic, powder driven, and hydraulic tool safety.

Responsibility

Management:

- Provide correct tools for assigned tasks.
- Ensure all tools are maintained and stored safely.
- Provide employee training.
- Provide for equipment repair.

Employees:

- Follow proper tool safety guidelines.
- Report tool deficiencies and malfunctions.
- Properly store tools when work is completed.

Hazard Controls

Engineering:

- Properly designed tools.
- Guards and Safety Devices functional and in place (as designed by the OEM).

Administrative:

- Tool sharpening program.
- Use of Personal Protective Equipment (PPE).
- Control of tool issue.
- Employee training.
- Controlled access to equipment and tool areas.

General Safety Precautions

Employees who use hand and power tools and who are exposed to the hazards of falling, flying, and abrasive objects, or exposed to harmful dusts, fumes, mists, vapors, or gases must be provided with the particular PPE to protect them from the hazard.

All hazards involved in the use of tools can be prevented by following the five basic safety rules:

- All hand and power tools (TEI owned or employee owned) shall be maintained, operated and stored in a safe condition with regular scheduled maintenance per manufacturer's specification.
- Use the right tool for the job.
- Employees shall examine each tool for damage before each and every use. All tools that are damaged and/or deemed unsafe shall be removed from use and tagged ***"Do Not Use."*** ***Additionally, the tool shall be rendered inoperable by locking the controls and/or removing the energy source if applicable.***
- Operate according to the manufacturer's instructions.
- The company shall provide and require the use proper PPE. The minimum required PPE for the operation of hand and power tools shall be: Safety Glasses w/side shields, face shield, or goggles; Gloves when applicable (based on hazard); Hearing Protection for power tool operation; FR clothing for all hot work (i.e., grinding).

Hand Tools

- ❑ Hand tools are non-powered. They include anything from axes to wrenches. The greatest hazards posed by hand tools result from misuse and improper maintenance. Some examples:
 - Using a screwdriver as a chisel may cause the tip of the screwdriver to break and fly, hitting the user or other employees.
 - If a wooden handle on a tool such as a hammer or an axe is loose, splintered, or cracked, the head of the tool may fly off and strike the user or another worker.
 - A wrench must not be used if its jaws are sprung, because it might slip.
 - Impact tools such as chisels, wedges, or drift pins are unsafe if they have mushroomed heads. The heads might shatter on impact, sending sharp fragments flying.
- ❑ Appropriate PPE (i.e., safety goggles, gloves, etc.), should be worn due to hazards that may be encountered while using portable power tools and hand tools.
- ❑ Floors shall be kept as clean and dry as possible to prevent accidental slips with or around dangerous hand tools.
- ❑ Around flammable substances, sparks produced by iron and steel hand tools can be a dangerous ignition source. Where this hazard exists, spark-resistant tools made from brass, plastic, aluminum, or wood will provide safety.
- ❑ Use of cutting tools will require the user to wear the appropriate cut-rated gloves supplied by TEI.
 - Cutting should always be done with motion going away from the body; ensuring all body parts are out of the 'line of fire'.

Power Tool Precautions

- ❑ Power tools can be hazardous when improperly used. There are several types of power tools, based on the power source they use: electric, pneumatic, liquid fuel, hydraulic, and powder-actuated. The following general precautions should be observed by power tool users:
 - Never carry a tool by the cord or hose.
 - Never yank the cord or the hose to disconnect it from the receptacle.
 - Keep cords and hoses away from heat, oil, and sharp edges.
 - Disconnect tools when not in use, before servicing, and when changing accessories such as blades, bits and cutters.
 - All observers should be kept at a safe distance away from the work area.
 - Secure work with clamps or a vise, freeing both hands to operate the tool.
 - Avoid accidental starting. The worker should not hold a finger on the switch button while carrying a plugged-in tool.
 - Tools should be maintained with care. They should be kept sharp and clean for the best performance. Follow instructions in the user's manual for lubricating and changing accessories.
 - Be sure to keep good footing and maintain good balance.
 - The proper apparel should be worn. Loose clothing, ties, or jewelry can become caught in moving parts.

Guards

Hazardous moving parts of a power tool need to be safeguarded. For example, belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or moving parts of equipment must be guarded.

- ❑ Guards, as necessary, should be provided to protect the operator and others from the following:
 - Point of Operation
 - In-Running Nip Points
 - Rotating Parts, and
 - Flying Chips and Sparks
- ❑ ***All Safety guards must be in place and never be removed when a tool is being used.*** For example, portable circular saws must be equipped with guards. An upper guard must cover the entire blade of the saw. A retractable lower guard must cover the teeth of the saw, except when it makes contact with the work material. The lower guard must automatically return to the covering position when the tool is withdrawn from the work.
- ❑ Guards may not be manipulated in such a way that will compromise its integrity or compromise the protection in which intended.
- ❑ Guards shall meet the requirements set forth in ANSI B15.1.

Safety Switches

- ❑ The following hand-held powered tools are to be equipped with a momentary contact “on-off” control switch:
 - Drills
 - Tappers
 - Fastener Drivers
 - Horizontal, Vertical and Angle Grinders with wheels larger than 2 inches in diameter.
 - Disc & Belt Sanders
 - Reciprocating and Saber Saws
 - Other Similar Tools
- ❑ Other hand-held powered tools such as circular saws having a blade diameter greater than 2 inches, chain saws, and percussion tools without positive accessory holding means must be equipped with a constant pressure switch that will shut off the power when the pressure is released.

Electrical Safety

Among the chief hazards of electric-powered tools are burns and slight shocks that can lead to injuries or even heart failure. Under certain conditions, even a small amount of current can result in severe injury and eventual death. A shock also can cause the user to fall off a ladder or other elevated work surface.

- ❑ To protect the user from shock, tools must either have a three-wire cord with ground or be grounded, be double insulated, or be powered by a low-voltage isolation transformer. Three-wire cords contain two current-carrying conductors and a grounding conductor. One end of the grounding conductor connects to the tool’s metal housing. The other end is grounded through a prong on the plug. The third prong should never be removed from the plug.

- ❑ Double insulation is more convenient. The user and the tools are protected in two ways: by normal insulation on the wires inside, and by a housing that cannot conduct electricity to the operator in the event of a malfunction.
- ❑ ***Electric Power Tool General Safety Practices:***
 - Electric tools should be operated within their design limitations.
 - Gloves and safety footwear are recommended during use of electric tools.
 - When not in use, tools should be stored in a dry place.
 - Electric tools should not be used in damp or wet locations.
 - Work areas should be well lighted.

Pneumatic Tools

Pneumatic tools are powered by compressed air and include chippers, drills, hammers, and sanders. There are several dangers encountered in the use of pneumatic tools. The main one is the danger of getting hit by one of the tool's attachments or by some kind of fastener the worker is using with the tool. Eye protection is required and face protection is recommended for employees working with pneumatic tools. Working with noisy tools such as jackhammers requires proper, effective use of hearing protection.

- ❑ When using pneumatic tools, employees are to check to see that they are fastened securely to the hose to prevent them from becoming disconnected. A short wire or positive locking device attaching the air hose to the tool will serve as an added safeguard.
- ❑ A safety clip or retainer must be installed to prevent attachments, such as chisels on a chipping hammer, from being unintentionally shot from the barrel.
- ❑ Screens must be set up to protect nearby workers from being struck by flying fragments around chippers, riveting guns, staplers, or air drills.
- ❑ Compressed air guns should never be pointed toward anyone. Users should never "dead-end" it against themselves or anyone else.

Compressed Air

- ❑ Compressed air shall not be used for cleaning purposes except where the pressure is reduced to less than 30 p.s.i. and effective chip guarding and personal protective equipment is implemented.
- ❑ Visual inspection of compressed gas cylinders must be performed prior to use. This inspection must follow the guidelines that apply to the scope of work as described in your daily Task Hazard Analysis. These guidelines are available in the Hazardous Materials Regulations of the Department of Transportation and pamphlets C-6 and C-8 from the Compressed Gas Association which can be located on TEI's Public Folders safety files in Outlook.
- ❑ Every air receiver shall be equipped with an indicating pressure gauge, so located as to be readily visible, and with one or more spring-loaded safety valves. The total receiving capacity of such safety valves shall be such as to prevent pressure in the receiver from exceeding the maximum allowable working pressure of the receiver by more than 10 percent.
- ❑ All safety valves shall be tested frequently (at a minimum weekly) and monthly to determine whether they are in good operating condition. Safety Valves, indicating/controlling devices, and other safety appliances need to be constructed, located, and installed so they cannot be rendered inoperative by any means.

- ❑ **The drain valve on air receivers shall be opened and the receiver completely drained frequently (at a minimum weekly) and at such intervals as to prevent the accumulation of excessive amounts of liquid in the receiver.**

Powder-Actuated Tools

Powder-actuated tools operate like a loaded gun and should be treated with the same respect and precautions. In fact, they are so dangerous that they must be operated only by specially trained employees (i.e., Original Equipment Manufacturer, Competent Person). This training will be coordinated by the Safety Divisions with the appropriate Warehouse or Shop Manager.

- Powder-Actuated Tool Safety:
 - These tools should not be used in an explosive or flammable atmosphere.
 - Before using the tool, the worker should inspect it to determine that it is clean, that all moving parts operate freely, and that the barrel is free from obstructions.
 - The tool should never be pointed at anybody.
 - The tool should not be loaded unless it is to be used immediately. A loaded tool should not be left unattended, especially where it would be available to unauthorized persons.
 - Hands should be kept clear of the barrel end. To prevent the tool from firing accidentally, two separate motions are required for firing:
 - One to bring the tool into position, and
 - Another to pull the trigger.
 - The tools must not be able to operate until they are pressed against the work surface with a force of at least 5 pounds greater than the total weight of the tool.
- ❑ If a powder-actuated tool misfires, the employee should wait at least 30 seconds, and then try firing it again. If it still will not fire, the user should wait another 30 seconds so that the faulty cartridge is less likely to explode, and then carefully remove the load. The bad cartridge should be put in water.
- ❑ Suitable eye and face protection are essential when using a powder-actuated tool.
- ❑ The muzzle end of the tool must have a protective shield or guard centered perpendicularly on the barrel to confine any flying fragments or particles that might otherwise create a hazard when the tool is fired. The tool must be designed so that it will not fire unless it has this kind of safety device.
- ❑ All powder-actuated tools must be designed for varying powder charges so that the user can select a powder level necessary to do the work without excessive force.
- ❑ If the tool develops a defect during use it should be tagged and taken out of service immediately until it is properly repaired.

Powder-Actuated Tool Fasteners:

- ❑ When using powder-actuated tools to apply fasteners, there are some precautions to consider. Fasteners must not be fired into material that would let them pass through to the other side. The fastener must not be driven into materials like brick or concrete any closer than 3 inches to an edge or corner. In steel, the fastener must not come any closer than ½ inch from a corner or edge. Fasteners must not be driven into very hard or brittle materials that might chip or splatter, or make the fastener ricochet.
- ❑ An alignment guide must be used when shooting a fastener into an existing hole. A fastener must not be driven into a spalled area caused by an unsatisfactory fastening.

Hydraulic Power Tools

The fluid used in hydraulic power tools must be an approved fire-resistant fluid and must retain its operating characteristics at the most extreme temperatures to which it will be exposed. The manufacturer's recommended safe operating pressure for hoses valves, pipes, filters, and other fittings must not be exceeded.

Jacks:

- ❑ All jacks - lever and ratchet jacks, screw jacks, and hydraulic jacks – must have a device that stops them from jacking up too high. Also, the manufacturer's load limit must be permanently marked in a prominent place on the jack and should not be exceeded.
- ❑ A jack should never be used to support a lifted load. Once the load has been lifted, it must immediately be blocked up.
- ❑ Use wooden blocking under the base if necessary to make the jack level and secure. If the lift surface is metal, place a 1-inch-thick hardwood block or equivalent between it and the metal jack head to reduce the danger of slippage.
- ❑ To set up a jack, make certain of the following:
 - The base rests on a firm level surface.
 - The jack is correctly centered.
 - The jack head bears against a level surface, and
 - The lift force is applied evenly.
- ❑ Proper maintenance of jacks is essential for safety. All jacks must be inspected before each use and lubricated regularly. If a jack is subjected to an abnormal load or shock, it should be thoroughly examined to make sure it has not been damaged.
- ❑ Hydraulic jacks exposed to freezing temperatures must be filled with adequate antifreeze liquid.

Cordless Power Tools

At TEI, cordless tools come in many types; read and understand the manufacturer's operator's manual for the type of cordless tool you are using. Also, review and make yourself familiar with TEI's Hand and Power Tool Safety policy.

- ❑ **Personal Safety**
 - Read and understand the tool's operator's manual, tool markings and the instructions packaged with the tool and its accessories (i.e., battery pack, charger, RPM's required for saw blades, etc.) before starting any work.
 - Include on your pre-job/daily THA (reference the Risk Assessment Guide at the end of this policy) the risks, the level of hazard and the control measures you are implementing.
 - Cordless power tools may create sparks, so do not use them in an explosive atmosphere (i.e., confined space, chemical plant, refinery, etc.), near flammable liquids, gases or dust.
 - To avoid accidental starting, remove batteries or lock off the switch when the tool is not being used, when changing accessories, and when adjusting or cleaning tools.
 - Keep hands away from rotating or moving parts.
 - Never remove a guard, or operate a tool with a missing or broken guard. Red Tag the damaged tool immediately and give to your Foreman/Supervisor.
 - Broken or abused battery packs can leak chemicals that can cause irritation or burns. If you come into contact with these chemicals, flush the area with water. If it contacts the eyes, flush with water and seek medical help.

- Batteries may vent gas that can explode near a source of ignition, like a pilot light. Never use any cordless tool in the presence of an open flame.
- Do not place battery packs near fire or heat. The battery packs could explode.
- ❑ **Choose the Right Battery Pack for the Tool**
 - Use cordless tools only with their Original Equipment Manufacturer's battery packs. Other battery packs may create a risk of fire, burns and explosions.
- ❑ **Charge Battery Packs Safely**
 - Charge battery packs only with their Original Equipment Manufacturer's chargers.
 - Charge in a dry location.
 - Do not charge near combustible materials. If the charger malfunctions, it can cause a fire.
 - Do not use a charger or battery pack if it has been hit, dropped or damaged. Remove from service immediately, Red Tag and turn into the Line Shop or Warehouse.
 - Do not take apart the charger or battery pack. Return it to the Line Shop or Warehouse if it is not functioning properly.
- ❑ **Maintain & Store Battery Packs Safely**
 - Clean the contacts on the battery pack and tool with a pencil eraser if the tool is not working at full power with a fully charged battery pack.
 - Send the tool, charger, and battery pack to the Line Shop or Warehouse for repairs. Do not attempt to repair them yourselves.
 - Store battery packs away from other metal objects like paper slips, coins, keys, nails, screws, fittings, or other small metal objects. These things can make a connection from one terminal to the other, shorting the battery terminals together and causing burns or fire.
 - Store the battery pack away from extreme temperatures or conditions.
- ❑ **Disposing of Battery Packs**
 - Properly dispose of battery packs to help protect our customers' work sites and our environment.
 - Battery pack chemicals can be dangerous to you, your fellow workers, and the environment. Local, State or Federal laws (as well as our customers) prohibit disposal of certain batteries in ordinary trash. Always send your battery packs to the TEI Line Shop or Warehouse when they are at "End of Use" or are damaged.
 - Never incinerate a battery pack or throw it into fire. Battery packs can explode in a fire.

Abrasive Wheels & Tools

One of the most common pieces of machinery in shops/warehouses is the abrasive wheel grinder. These useful machines, used to remove metal from flat and cylindrical surfaces, are available in two types. Some are bench or pedestal grinders that stay in one place; the others are portable abrasive tools that are used for repair jobs elsewhere in the facility.

There is also more than one type of grinder design. On some, the abrasive wheels are mounted so only the exposed flat side is used for grinding. Other machines are designed so that the grinding is done on the circumference of the wheel. Some grinders also have wire brush or buffing wheel attachments.

People who regularly use abrasive wheel grinders may not be aware of their hazards. In recognition of these potential hazards, the Occupational Safety and Health Administration (OSHA) has implemented a series of

regulations [General Industry Standards Title 29, Code of Federal Regulations, Part 1910.215 to help protect workers who operate abrasive wheel grinders.

Because Thompson Electric recognizes that abrasive wheel grinder safety is not limited to machine design and set-up, we have developed this policy as a way of addressing potential hazards involved in the operation and care of these machines.

- The inspection, handling and storage of abrasive grinding wheels.
- Proper grinding wheel mounting procedures.
- Work rests and the role they play in abrasive wheel grinder safety.
- How to perform a ring test on a wheel and what to listen for during the testing procedure.
- Personal Protective Equipment (PPE) required.

Policy for Abrasive Grinding Wheel

Thompson Electric is committed to provide a safe and healthful work environment for our entire staff. In pursuit of this endeavor, the following Abrasive Wheel Grinder Plan is provided to eliminate or minimize the risk of injury in accordance with OSHA Abrasive Wheel Machinery, Title 29 CFR Code of Federal Regulations 1910.215.

The Abrasive Wheel Grinder Plan is a key document to assist our firm in implementing and ensuring compliance with the standard, thereby protecting our employees. This Abrasive Wheel Grinder Plan includes, but is not limited to:

- Daily Inspection
- Truing or Dressing Grinding Wheels
- Ring Test Procedure
- Mounting Procedures
- Recordkeeping

Inspection, Handling and Storage of Abrasive Grinding Wheels

All grinding wheels are subject to damage and breakage if they are not handled and stored carefully and properly.

- ❑ Do not strike, bump or drop grinding wheels.
- ❑ Use PPE to protect your hands, eyes, ears and lungs.
- ❑ Don't wear anything loose or dangling that could get caught in the machine.
- ❑ Guards block direct contact between the machine's sharp edges and your hands and fingers; never remove or operate an abrasive grinder without the guards.
- ❑ The "**rests**", when positioned properly, prevent work from getting jammed, which may either break the wheel or create a situation where your hands or fingers could get stuck and injured.
- ❑ Check all the adjustments and the condition of the wheel itself before starting any job with abrasive grinding wheels (*see Daily Inspection Checklist*).
- ❑ Before using a wheel, perform a ring test (*see Ring Test Procedure*) and listen for a clear metallic "ping" to tell you that the wheel isn't cracked. If you hear a dull thud, the wheel is probably cracked and should not be used.

Like all machines, abrasive wheel grinders are as safe as the way you use them. By following this policy's guidelines and procedures, your own good sense, and keeping this equipment in good working order, you can prevent injuries.

Daily Inspection Checklist

1. The side wheel guards are aligned and fastened securely so that the wheel will spin without rubbing against them.
2. The tongue guard is properly aligned so that the wheel doesn't scrape it, but so that no more than one-quarter inch of space is between it and the wheel.
3. The work rest is securely clamped and within one-eighth of an inch of the wheel; its height is on the horizontal center line of the machine's spindle.
4. The grinder frame is mounted securely and doesn't vibrate when the machine runs.
5. The wheel face is well lit and evenly dressed.
6. The flanges (the metal rims on each side of the wheel that hold it in place) are of equal size and they're the correct diameter - which shall not be less than one-third the diameter of the wheel.
7. The speed is correct for the wheel that's mounted; The speed should never be higher than the manufacturer's recommendation (printed on the wheel in RPM's).
8. The power belt or drive guard is in place.
9. The electrical power source is properly grounded and its cord and connections are in good condition.
10. Dry grinding operations are connected to an exhaust system.
11. The wheel is evenly worn, without substantial nicks and scrapes or indications of cracks (see "Ring Test" Procedure).
12. The grinder should be turned on, while standing off to the side, to make sure it's operating safely.
13. The work area is dry and free of debris or material that could be ignited by sparks.
14. Proper PPE equipment is being worn (See "Thompson Electric" Policy on Personal Protective Equipment).
15. Proper grinding surfaces and wheel balance must be maintained to prevent damaged work or unsafe operation. Wheels should only be trued or dressed by personnel trained specifically for this hazardous task using special tools equipped with hood guards (See Truing or Dressing Grinding Wheels).

Ring Test Procedure

Do a ring test when a new disk or wheel is unpacked and before each time it's mounted. The ring test should be repeated just before remounting a used grinding wheel.

- ☐ Grinding wheels must be dry and free from sawdust or other dampening foreign matter when given the ring test.
- ☐ NOTE: The ring test may not be effective on grinding wheels that have been bonded with organic materials, such as rubber. These materials cause the wheel to sound "cracked" even if it is in good condition.
- ☐ To properly check a wheel, suspend lightweight wheels from the hole with a finger or small pin; set heavy wheels vertically on a hard floor.
- ☐ Locate the "tap points" on the wheel. These are one to two inches from the outer edge and, as if you're looking at a clock, at 1:30 and 10:30 on all wheels and also at 4:40 and 7:30 on light, freely suspended wheels.
- ☐ Then tap these points approximately 2 inches from the periphery. For light wheels, a wooden or plastic screwdriver handle, or another non-metallic object. When testing larger wheels, set the wheel

on its periphery on a clean hard surface or floor. Heavier wheels may be lightly tapped with a wooden mallet.

- ❑ If wheels are tapped directly along a line that is vertical to the hole, the holding device will muffle the tone and the wheel could sound cracked. This may occur more frequently when the large wheels are being tested.
- ❑ A grinding wheel that's in good condition will “ring” when tapped in the proper way; if cracked, it will emit a dull sound.

Grinding Wheel Mounting Procedures

It is extremely important to mount and install grinding wheels properly to avoid personal injuries and damage to the wheel or work.

1. **Flanges:** A flat, uniform surface must be maintained between the grinding wheel (Type 1) and the flanges. Check flanges with a straight edge to make sure that they are not warped or sprung.
 - ▶ If flanges face each other without parallel surfaces on the mandrel or arbor, they can be expected to fail and cause the grinding wheel to crack or shatter.
 - ▶ Never use worn or bent flanges. Be sure flanges are a minimum of one-third the diameter of the wheel and that they fit the arbor sufficiently, according to the manufacturer's recommendations.
 - ▶ Cut-off wheels have a minimum flange diameter of one-fourth the diameter of the wheel. Plan enough clearance to prevent damage to the wheel. For a standard size wheel, plus zero, minus 0.002 in., measured at 30 C (68F), should be used as a guide in selecting grinding wheel hole to spindle clearance.
 - ▶ Distorted flanges or burrs cause uneven pressure when clamping the grinding wheel, and may result in damage to work or personnel injury.
2. When mounting a Type 1 grinding wheel, check flanges for adequate strength and thickness to make sure that the wheel is properly supported.
3. Check the surface of the grinding wheel and flanges to make sure that no foreign materials are present.
4. Mounting blotters made of compressible material are supplied by the grinding wheel manufacturer and should be used. Blotters must always be at least as large in diameter as the flanges and must cover the entire contact area of wheel flanges. Blotter material should not exceed 0.025 in. (0.63 mm) in thickness.
5. Flanges used in mounting regular Type 1 grinding wheels with small spindle holes should be recessed or relieved on the face so that clamping pressure is on the outside, circumferential portion of the blotter, and there is no clamping pressure near the spindle.
6. When mounting cup and cone or similar type abrasive wheels with threaded holes, the single flange at the back of the wheels should be flat and not recessed. This flat back flange surface gives the wheel more needed support and strength.
7. Prior to mounting, check the pitch of the threads and rotation of the wheel so that the wheel or locking nut will tend to tighten, not loosen, when force is applied.
8. Tighten grinding wheels just enough to prevent them from slipping. It is particularly important to avoid over tightening the spindle nuts or clamping screws to prevent damaging the wheel, flanges or associated parts and to prevent over-stressing as the temperature of the wheel increases.

9. When using wheels with multiple screw mounting flanges, make sure that the bolts are uniformly tightened. Be careful not to create excess pressure by over-tightened mounting screws. A good procedure for tightening multiple-screw flanged wheels is to:
 - (a) barely tighten a screw;
 - (b) "snug-up" an opposite screw; and
 - (c) in a criss-cross manner, continue until all mounting screws are uniformly tight. Not more than 15 to 20 pounds of torque is usually required to properly tighten multiple-screw flange-mounted grinding wheels. Always use a torque wrench.
10. **Reducing bushings.** If the hole size in the grinding wheel is too large for the arbor, reducing bushings may be used to help in proper mounting of the wheel. If questions arise about the use of reducing bushings, consult the wheel manufacturer. The reducing bushing should not interfere with proper flange fit.

Personal Protective Equipment for Abrasive Grinding Wheels

- ☐ Safety eyeglasses with side shields to prevent chips or particles from getting into your eyes.
 - ☐ Gloves to protect your hands from flying particles and sharp edges created during the grinding operation.
- NOTE: If you are using "Polishing" or "Buffing" wheels, do not wear gloves, but don't hold small pieces against a wheel with your bare hands, either; use a piece of old line or canvas wheel.**
- ☐ If using a "Wire Brush" wheel, a heavy apron made of leather or heavy canvas, leather gloves, a face shield and goggles is required PPE equipment. This amount of protection is necessary, as wires tend to break off the wheel.
 - ☐ Hearing protectors to prevent hearing damage from all the noise grinding creates.
 - ☐ Because you don't wear a full protective suit for grinding jobs, you also need to pay attention to your personal clothing. The essential rule is "don't wear anything loose that could get caught in the machine." Scarves, ties, loose hair, and dangling jewelry could be dangerous. If you're wearing a long-sleeved shirt, button it at the wrist.
 - ☐ Repair and/or replacement of PPE will be at no cost to employees.

Truing or Dressing Grinding Wheels

Proper grinding surfaces and wheel balance must be maintained to prevent damaged work or unsafe operations. Wheels may be trued or dressed to improve cutting action. Dressing removes glaze, dulled particles or loading that occurs because of the presence of foreign matter on the grinding face.

- ☐ The dressing or truing tool must be supported by a tool rest so that the wheel is properly dressed or trued.
- ☐ The dressing or truing tool is made by mounting several small, extremely hard-toothed metal hooks behind the tool rest.
- ☐ Adjust the tool rest so that the heel of the dressing and truing tool can be evenly moved along the tool rest in order to obtain the desired wheel face.
- ☐ When using a dressing or truing tool, hold the tool handle so that the inner end points toward the center of the grinding wheel and the out end coincides with, and extends to, the radius of the wheel.
- ☐ If the tool handle is held too low at the outer end, it may grab or jab between the tool rest and the wheel, thus damaging the surface or injuring the worker.
- ☐ If a wheel cannot be adequately dressed - it's too worn or out of balance - throw it away.

Work Rests

Off-hand grinding is defined in OSHA 1910.211(b)(11) as the grinding of any material or part which is held in the operator's hand. ANSI B7.1-1988 requires that work rests must be used to support the work when doing off-hand grinding. These rests must be rigidly constructed, but still allow for adjustments that compensate for wheel wear.

- ❑ Work rests are required for all off-hand grinding machines.
- ❑ Work rests must be continually adjusted to within 1/8 in. (3.2 mm) of the wheel to minimize jamming the work between the rest and the wheel, an action that may cause possible wheel breakage.
- ❑ The work rest must be kept securely fastened.
- ❑ Adjust work rests only when the motor-drive system is de-energized and locked out.

Guards

One of the most important requirements for safety when using bench and pedestal grinders is that the grinders have proper guarding. Safety guards must be strong enough to protect the operator and those nearby from flying wheel pieces, in case the wheel disintegrates.

- ❑ The guard needs to cover both sides, spindle, end, nut, flange projection and the periphery of the wheel, leaving not more than 90 degrees or 1/4 of the periphery.
- ❑ If grinding work must be done below the horizontal plane of the spindle, do not expose more than 125 degrees of outer periphery.
- ❑ An adjustable peripheral safety guard or tongue guard (one that can be adjusted inward as the wheel diameter is reduced from wear) should be installed on the grinder. The distance provided by this guard should not exceed 1/4 in. (6 mm).
- ❑ It is important to remember that wheel pieces will fly tangentially in the direction of the wheel rotation and that wheel guards are designed to protect the operator from flying pieces. Therefore, mount hinged, transparent face guards over the exposed wheel, above the open guard area, when possible.

Definitions for Abrasive Grinding Wheels

There are several definitions that should be explained which specifically apply to this regulation.

Abrasive Type - The two main types of abrasive are silicon carbide (C) and aluminum oxide (A). A manufacturer may also add its own symbol or brand as a prefix.

Abrasive (grain) size - Common abrasive grain sizes are 8, 10, 12, 14, 16, 20, 24, 30, 36, 46, 54, 60, 70, 80, 90, 100, 120, 150, 180 and 220; the larger numbers indicate finer grain sizes.

Bond Type - Grinding wheel bonding material is designated by letters of the alphabet as follows:

B = Resinoid	BF=Resinoid Reinforced	E=Shellac	O=Oxychloride
R=Rubber	RF=Rubber Reinforced	S=Silicate	V=Vitrified

Those most commonly used for this application are V-Vitrified and B-Resinoid.

Cutting Off Wheels - usually thin abrasive wheels made with metal or organic bonding material.

Cylindrical Grinding Wheels (between centers) - Used for grinding the outer surface of a part that (1) is held up on a work blade rather than being held between centers and (2) rotated by a regulating wheel.

Cylindrical Grinding Wheels (center-less) - Used for grinding the outer surfaces of a part that (1) is held up on a work blade rather than being held between centers and (2) rotated by a regulating wheel.

Grade - Grinding wheel hardness grade is indicated by letters of the alphabet from “A” (soft) to “Z” (hard) in all bond types.

Internal Grinding Wheels - Used for grinding the inside surface of an opening in the work.

Manufacturer's Record - A manufacturer's symbol may be used in the sixth place to record specific factory data.

Offhand Grinding - Wheels used for offhand or freehand grinding, with the work hand-held by the operator.

OSHA - Occupational Safety and Health Administration of the U.S. Department of Labor; the Federal agency with safety and health regulatory and enforcement authorities for most U.S. industry and business.

Personal Protective Equipment - Specialized clothing or equipment worn by an employee for protection against a hazard.

Saw-gumming Wheels - Used for sawtooth shaping, deepening and sharpening.

Snagging - Used to remove mold marks, casting parting lines, surface defects from billets and excess metal from welds by removing a large amount of metal with little concern for exact dimensions or surface finish.

Standard Grinding Wheel Markings - Each new grinding wheel is generally marked with a nationally recognized, six-part sequence of symbols (numbers and letters) that denotes the most essential characteristics of the wheel. The six parts of the abrasive wheel marking occur in the following sequence:

(1) Abrasive Type	(2) Abrasive (grain) size	(3) Grade
(4) Structure	(5) Bond Type	(6) Manufacturer's Record

These markings are useful for matching the type of wheel used to the work required.

Structure - Grinding wheel grain structure (close or open) is often shown with number 1 (close-grained) to 16 (open-grained) to indicate the degree of close or open grain structure.

Surface Grinding - An abrasive wheel used to grind a plane surface.

Tool Grinding - Shaping and sharpening of tools, such as chisels, drills, reamers, taps, cutting tools and end mills.

Hazard	Effect	Control measures	Residual risk
Electricity	Electric shock	- Check condition of lead and plug before use. - Use 110v or battery tools or RCD where practicable - Check for hidden and/or buried cables before drilling etc. (i.e., 811, plans, drawings, etc.) - Do not work where water is present without reviewing manufacturer's warnings - Qualified person should test all portable electrical hand tools at least annually	Low
Flammable/explosive atmosphere	Fire/Explosion	- Do not use heat generating equipment without Hot Work Permit - Do not work near flammables, compressed gases, in explosive atmospheres or confined spaces without consulting Safety - Review during THA before using flammable fuel or gas driven equipment	Low
Moving parts	Entanglement	- Loose clothing, jewelry and long hair to be kept clear of moving parts - Maintain all manufacturer's guards	Low
Flying debris, etc.	Eye, hand or facial injury	Use protective eyewear or face shield - Wear protective gloves where appropriate - Advise nearby persons of hazards - Isolate area with barriers, tape etc. where necessary	Low
Noise	Hearing damage	Wear hearing protection if above 80dB(A) or if uncomfortably loud (request assessment if in doubt). - Advise nearby persons of noise hazard - Foremen should inform users of risks from noise	Low/moderate
Vibration	Hand/Arm Vibration Syndrome (HAVS) Carpal Tunnel Syndrome	- Select power tools with lowest vibration levels. - Minimise the time individuals use the equipment (i.e. job rotation). - Restrict use of vibration-inducing tools to recommended times (see manufacturer's information). - Ensure tools are properly stored, maintained and used according to manufacturer's instructions. - Risks from vibration should be reviewed during THA	Low/moderate

Hazard	Effect	Control measures	Residual risk
Ergonomic	Musculo-skeletal injury	- Ensure there is adequate room to do the job - Minimize the time individuals use heavy equipment (i.e., job rotation) - Use jigs and suspension systems to assist the handling of heavy equipment (e.g. large grinders) - Wear safety footwear unless feet protected by other means (e.g. sitting at a bench)	Low/moderate
Slips, trips and falls	Minor injury Major injury Fatal injury	- Ensure work area is free (as is practicable) from trailing cables, tools, materials, debris and spills - All work should be from a suitable and stable work platform - The use of ladders restricted to trained users and must be cleared with supervisor	Moderate Low Low
Dust	Respiratory illness Reduced visibility Skin irritation	- Check for fit - Increase ventilation to work area (i.e., open windows, temporary extract etc.) - Wear close-fitting safety goggles - Stop working if visibility is noticeably reduced - Wear suitable protective clothing (especially gloves) - Clean work area regularly (e.g. HEPA filtered vacuum, wash down)	Low
Air-line detaching or bursting	Eye/face injury Distraction	- Check condition and connections of air-line before use - Use of Whip Checks - Ensure air-line is not on a traffic route (pedestrian or vehicular)	Low
Tool jamming or binding	Wrist/hand injury	- Check tool is appropriate for the job and used in accordance with manufacturer's instructions - Trained operators only (or under strict supervision for training purposes) - Ensure tools are maintained according to manufacturer's instructions	Low/moderate
Inappropriate use	All of above	- Check tool is appropriate for the job and used in accordance with manufacturer's instructions - Inexperienced power tools users should be supervised or observed when first using an unfamiliar item of equipment or in an unfamiliar environment - Power tools should be securely stored when not in use	Low/moderate

IMPORTANT SAFETY INSTRUCTIONS

⚠WARNING **READ AND UNDERSTAND ALL INSTRUCTIONS.** Failure to follow all instructions listed below, may result in electric shock, fire and/or serious personal injury.

SAVE THESE INSTRUCTIONS.

- 1. SAVE THESE INSTRUCTIONS - THIS OPERATOR'S MANUAL CONTAINS IMPORTANT SAFETY AND OPERATING INSTRUCTIONS FOR MILWAUKEE® LI-ION BATTERY PACKS AND THE MILWAUKEE® LI-ION CHARGER.**
- 2. BEFORE USING THE BATTERY PACK AND CHARGER, READ THIS OPERATOR'S MANUAL, YOUR TOOL OPERATOR'S MANUAL, AND ALL LABELS ON THE BATTERY PACK, CHARGER AND TOOL.**
- 3. CAUTION - TO REDUCE THE RISK OF INJURY, CHARGE MILWAUKEE® LITHIUM-ION PACKS ONLY IN THEIR MILWAUKEE® LITHIUM-ION CHARGER.** Other types of chargers may cause personal injury or damage. Battery pack and charger are not compatible with V™-technology or NiCd systems. Do not wire a battery pack to a power supply plug or car cigarette lighter. Battery packs will be permanently disabled or damaged.
- 4. USE MILWAUKEE® LITHIUM-ION PACKS ONLY ON COMPATIBLE MILWAUKEE® LITHIUM-ION TOOLS.** Battery pack and charger are not compatible with V™-technology or NiCd systems. Use with other tools may result in a risk of fire, electric shock or personal injury.
- 5. AVOID DANGEROUS ENVIRONMENTS.** Do not charge battery pack in rain, snow, damp or wet locations. Do not use battery pack or charger in the presence of explosive atmospheres (gaseous fumes, dust or flammable materials) because sparks may be generated when inserting or removing battery pack, possibly causing fire.
- 6. CHARGE IN A WELL VENTILATED AREA.** Do not block charger vents. Keep them clear to allow proper ventilation. Do not allow smoking or open flames near a charging battery pack. Vented gases may explode.
- 7. DO NOT BURN OR INCINERATE BATTERY PACKS.** Battery packs may explode, causing personal injury or damage. Toxic fumes and materials are created when battery packs are burned.
- 8. DO NOT CRUSH, DROP, OR DAMAGE** battery pack. Do not use a battery pack or charger that has received a sharp blow, been dropped, run over, or damaged in any way (e.g., pierced with a nail, hit with a hammer, stepped on).
- 9. DO NOT DISASSEMBLE.** Incorrect reassembly may result in the risk of electric shock, fire or exposure to battery chemicals. If it is damaged, take it to a MILWAUKEE® service facility.
- 10. BATTERY CHEMICALS CAUSE SERIOUS BURNS.** Never allow contact with skin, eyes, or mouth. If a damaged battery pack leaks battery chemicals, use rubber or neoprene gloves to dispose of it. If skin is exposed to battery fluids, wash with soap and water and rinse with vinegar. If eyes are exposed to battery chemicals, immediately flush with water for 20 minutes and seek medical attention. Remove and dispose of contaminated clothing.
- 11. DO NOT SHORT CIRCUIT.** A battery pack will short circuit if a metal object makes a connection between the positive and negative contacts on the battery pack. Do not place a battery pack near anything that may cause a short circuit, such as coins, keys or nails in your pocket. Do not allow fluids to flow into battery pack. Corrosive or conductive fluids, such as seawater, certain industrial chemicals, and bleach or bleach containing products, etc., can cause a short circuit. A short circuited battery pack may cause fire, personal injury, and product damage.
- 12. STORE YOUR BATTERY PACK AND CHARGER** in a cool, dry place. Do not store battery pack where temperatures may exceed 50°C (120°F) such as in direct sunlight, a vehicle or metal building during the summer.
- 13. ALWAYS USE A SIDE HANDLE** when using a 9.0 Ah or higher capacity battery pack; the output torque of some tools may increase. If your drill/driver did not come with a side handle, visit www.milwaukeetools.com.au for the appropriate accessory handle.

READ AND SAVE ALL INSTRUCTIONS FOR FUTURE REFERENCE.

SYMBOLGY	
	Volts
	Direct Current
	Properly Recycle Batteries

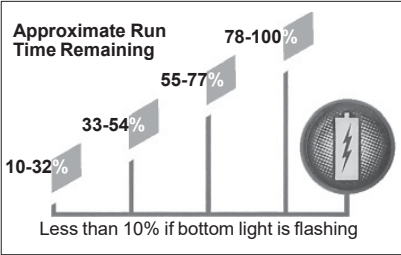
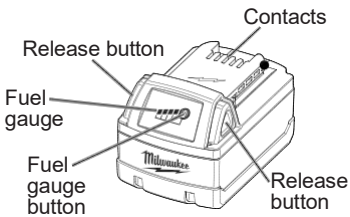
Fuel Gauge

Use the Fuel Gauge to determine the battery pack's remaining run time. Press the Fuel Gauge button to display the lights. The Fuel Gauge will light up for 2-3 seconds. When less than 10% of charge is left, 1 light on the fuel gauge will flash slowly.

NOTE: If the Fuel Gauge doesn't appear to be working, place the battery pack on the charger and charge as needed.

Compared to NiCd battery pack types, MILWAUKEE® Lithium-Ion battery packs deliver fade-free power for their entire run time. The tool will not experience a slow, gradual loss of power as you work. To signal the end of discharge, 1 light on the fuel gauge will flash quickly for 2-3 seconds and the tool will not run. Charge the battery pack.

NOTE: Immediately after using the battery pack, the Fuel Gauge may display a lower charge than it will if checked a few minutes later. The battery cells "recover" some of their charge after resting.



Battery Pack Protection

To protect itself from damage and extend its life, the battery pack's intelligent circuit monitors current draw and temperature. In extremely high torque, binding, stalling, and short circuit situations, the battery pack will turn OFF the tool if the current draw becomes too high. All the fuel gauge lights will flash. Release the trigger and restart.

Under extreme circumstances, the internal temperature of the battery could become too high. If this happens, the fuel gauge lights will flash in an alternating pattern and the tool will not run. Allow the battery to cool down.

Fuel Gauge Lights	Diagnosis	Solution
Lights 1 - 4 Solid	Remaining run time	Continue working
1 Light, flashing slowly	Less than 10% run time left	Prepare to charge pack
1 Light, flashing quickly	End of discharge	Charge pack
Lights 1-4, flashing quickly	Current draw too high	Release trigger and restart, reduce pressure
Lights 1&3 / 2&4, flashing alternatingly	Battery temperature too high	Release trigger and allow battery to cool

Cold Weather Operation

MILWAUKEE® Lithium-Ion battery packs are designed to operate in temperatures below freezing. When the battery pack is too cold, it may need to warm up before normal use. Put the battery on a tool and use the tool in a light application. It may "buzz" for a short time until it warms up. When the buzzing stops, use the tool normally.

⚠WARNING **TO REDUCE THE RISK OF FIRE, PERSONAL INJURY, AND PRODUCT DAMAGE DUE TO A SHORT CIRCUIT, NEVER IMMERSE YOUR TOOL, BATTERY PACK OR CHARGER IN FLUID OR ALLOW A FLUID TO FLOW INSIDE THEM. CORROSIVE OR CONDUCTIVE FLUIDS, SUCH AS SEAWATER, CERTAIN INDUSTRIAL CHEMICALS, AND BLEACH OR BLEACH CONTAINING PRODUCTS, ETC., CAN CAUSE A SHORT CIRCUIT.**

Maintenance and Storage

Do not expose your battery pack or cordless tools to water or rain, or allow them to get wet. This could damage the tool and battery pack. Do not use oil or solvents to clean or lubricate your battery pack. The plastic casing will become brittle and crack, causing a risk of injury.

Store battery packs at room temperature away from moisture. Do not store in damp locations where corrosion of terminals may occur. As with other battery pack types, permanent capacity loss can result if the pack is stored for long periods of time at high temperatures (over 49°C). MILWAUKEE® Lithium-Ion battery packs maintain their charge during storage longer than other battery pack types. After about a year of storage, charge the pack as normal.

Transport

Personal transport of Li-Ion battery packs is allowed when done in accordance with these warnings and instructions. The proper classification, packaging, labeling, marking, and documentation requirements for shipping Li-Ion batteries is dependent upon whether the particular batteries are rated greater than or less than 100 Wh. Generally, Li-Ion batteries rated 100Wh or less are "excepted" from certain Class 9 DG requirements. Always check compliance of Li-Ion battery consignments against the current regulations governing the chosen mode of transport. When in doubt, contact the carrier or other trained Dangerous Goods professional to confirm acceptability. Li-Ion packs are shipped under classification UN 3480 (battery only) or UN3481 (batteries contained in or packed with equipment).

Disposing of MILWAUKEE® Li-Ion Battery Packs

MILWAUKEE® Lithium-Ion battery packs are more environmentally friendly than some other types of power tool battery packs (e.g., nickel-cadmium). Always dispose of your battery pack according to federal, state and local regulations. Contact a recycling agency in your area for recycling locations.

Even discharged battery packs contain some energy. Before disposing, use electrical tape to cover the terminals to prevent the battery pack from shorting, which could cause a fire or explosion.

⚠WARNING **TO REDUCE THE RISK OF INJURY OR EXPLOSION, NEVER BURN OR INCINERATE A BATTERY PACK EVEN IF IT IS DAMAGED, DEAD OR COMPLETELY DISCHARGED. WHEN BURNED, TOXIC FUMES AND MATERIALS ARE CREATED.**

WARRANTY - AUSTRALIA and NEW ZEALAND

Please refer to the Techtronic Industries Pty. Ltd. Warranty Terms and Conditions for MILWAUKEE® products and accessories which is supplied with the tool or kit. This warranty applies only to product purchased from an authorised MILWAUKEE® dealer in Australia or New Zealand.

SERVICE - AUSTRALIA and NEW ZEALAND

MILWAUKEE® prides itself in producing a premium quality product that is Nothing But Heavy Duty®. Your satisfaction with our products is very important to us! If you encounter any problems with the operation of this tool, please contact your authorised MILWAUKEE® dealer.

For a list of MILWAUKEE® dealers, guarantee or service agents please contact MILWAUKEE® Customer Service or visit our website.
(Australia Toll Free Telephone Number 1300 361 505)
(New Zealand Toll Free Telephone Number 0800 279 624) or visit www.milwaukeetools.com.au / www.milwaukeetools.co.nz.

Milwaukee Electric Tool Corporation
13135 West Lisbon Road, Brookfield, Wisconsin U.S.A. 53005

Milwaukee Tool (Australia)
21 Kelletts Road, Rowville, VIC 3178
Melbourne, Australia

Milwaukee Tool (New Zealand)
2 Landing Drive, Mangere
Auckland, 2022, New Zealand

Designed by Milwaukee Electric Tool Corp.
Professionally Made in China for Milwaukee Tool (Australia) / Milwaukee Tool (New Zealand)
Printed in China

TOOL(S) \ PRODUCT(S) AFFECTED: **REDLITHIUM™ Li-Ion Battery Pack 48-11-1812, 48-11-1815, 48-11-1820, 48-11-1828, 48-11-1830, 48-11-1835, 48-11-1840, 48-11-1850, 48-11-1860, 48-11-1865, 48-11-1880, 48-11-1890, 48-11-2001, 48-11-2130, 48-11-2401, 48-11-2402, 48-11-2420, 48-11-2430, 48-11-2440, 48-11-2460, 48-11-2830**

SUBJECT: Battery Pack Date Code – Where to Find – How to Read

MILWAUKEE BATTERY PACK CONTAINS A SERIES OF NUMERIC DIGITS INDICATING ITS 'DATE OF MANUFACTURE'

Where to Find

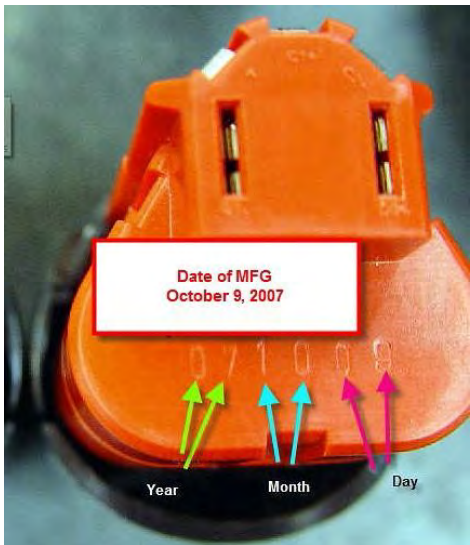
48-11-1812	18.0V	12.0 Ahr	216Wh	j	bottom housing, nameplate serial number
48-11-1815	18.0V	1.5 Ahr	27Wh	g, h	bottom housing, nameplate serial number or top housing, heat stamp
48-11-1820	18.0V	2.0 Ahr	36Wh	g, h, j	bottom housing, nameplate serial number or top housing, heat stamp
48-11-1828	18.0V	3.0 Ahr	54Wh	g, h	bottom housing, nameplate serial number or top housing, heat stamp
48-11-1830	18.0V	3.0 Ahr	54Wh	g, h	bottom housing, nameplate serial number or top housing, heat stamp
48-11-1835	18.0V	3.0 Ahr	54Wh	j	bottom housing, nameplate serial number
48-11-1840	18.0V	4.0 Ahr	72Wh	h	top housing, heat stamp
48-11-1850	18.0V	5.0 Ahr	90Wh	h, j	bottom housing, nameplate serial number or top housing, heat stamp
48-11-1860	18.0V	6.0 Ahr	108Wh	j	bottom housing, nameplate serial number
48-11-1865	18.0V	6.0 Ahr	108Wh	j	bottom housing, nameplate serial number
48-11-1880	18.0V	8.0 Ahr	144Wh	j	bottom housing, nameplate serial number
48-11-1890	18.0V	9.0 Ahr	162Wh	j	bottom housing, nameplate serial number
48-11-2001	4.0V	2.0/2.5 Ahr	8/10Wh	h	top housing, heat stamp
48-11-2130	18.0V	2.5 Ahr	Wh	j	bottom housing, nameplate serial number
48-11-2401	12.0V	1.4 Ahr	16Wh	f	top housing, heat stamp
48-11-2402	12.0V	2.6/3.0 Ahr	32Wh	g, h	bottom housing, nameplate serial number or top housing, heat stamp
48-11-2420	12.0V	2.0 Ahr	22Wh	h	top housing, heat stamp
48-11-2430	18.0V	3.0 Ahr	27/36Wh	j	bottom housing, nameplate serial number
48-11-2440	12.0V	4.0 Ahr	43Wh	h	top housing, heat stamp
48-11-2460	18.0V	6.0 Ahr	72Wh	h	top housing, heat stamp
48-11-2830	28.0V	2.8 Ahr	76Wh	g, h	bottom housing, nameplate serial number or top housing, heat stamp

How to Read

f	070628 / S070628	07 = YEAR	06 = MONTH	28 = DAY	S = PLANT
g	AXXAX0712XXXX	07 = YEAR	12 = WEEK		
h	130320 X top housing between + - signs	13 = YEAR	03 = MONTH	20 = DAY	X = PLANT
j	XXXXXXX 160317 XXXXXXX	16 = YEAR	03 = MONTH	17 = DAY	

See reverse-side for examples...

example "f"



example 'h'



example 'g'



example 'j'



Warranty Repair Process

- Date code of tool will be used to determine if product is within warranty period
- Copy of invoice or bill of sale will be required for warranty verification if date code is over warranty period

	Under Warranty	Out of Warranty
Cost	FREE Repairs or Replacements	Lightning Max Repair Quote
Coverage	- Product defective in material or workmanship	- Product outside of warranty period - Products within warranty period but defective due to normal wear/ tear and abuse
Not Covered	Normal wear and tear, abuse, missing parts/accessories	

Product Warranties

Warranty Period	Product Covered
5 Year Limited	M18™ & M12™ Tools, Corded Tools, Pneumatic Nailers, Chargers, M18™ Wet/Dry Vacuum, M18™ Compact Blower, M18™ & M12™ Lights, M12™ Test & Measurement Products, Alkaline Test & Measurement Products
3 Year Limited	M12™ REDLITHIUM™ XC Battery Packs: 3.0, 4.0, 6.0 M18™ REDLITHIUM™ XC Battery Packs: 3.0,4.0,5.0,6.0, 9.0
2 Year Limited	M12™ REDLITHIUM™ Compact Battery Packs: 1.5, 2.0 M18™ REDLITHIUM™ Compact Battery Packs: 1.5, 2.0
1 Year Limited	M12™ Heated & Non-Heated Gear, M12™ and M18™ Radios, Voltage detectors
Limited Lifetime	Hand Tools, LEDs

- 1 Year Limited warranty on recontools
- 90 Day Limited warranty on repaircomponents

30 Day Satisfaction Policy

If customer is not satisfied with any Milwaukee Tool within 30 days of purchase, the following conditions must be met in order to return the product:

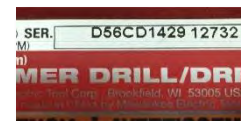
- Product and all components included must be returned to the original place of purchase
- Original sales receipt
- Tool and components must not show signs of abuse, misuse or modifications

Products not covered- Batteries (unless part of tool kit), Heated Gear, Reconditioned Tools, Mag Stands, FORCE LOGIC Tools, Accessories, T & M, Thermal Imaging

****All Hand Tools (including Empire) and Jobsite Work Boxes are field destroy if returned under 30 Day Satisfaction Policy****

Reading Milwaukee® Date Codes

How To Read Tool Code		
D56CD142912732	14 = Year	29 = Week



How To Read Battery Code			
180129	18 = Year	01 = Month	29 = Day



Milwaukee Service Options

eService Program

- Individual or small tool repair volume
- Convenience of submitting repair on their own
- Not near a Factory Service Center
- Convenient Drop-off: Over 8,000 FedEx locations across the US
- Tool sent directly to our Central Repair Facility HUB and directly back to user
- Milwaukee pays for freight to HUB & back for repairs under warranty
- User pays freight (\$10.95 flat fee) for non-warranty repairs



eSERVICE

The 24/7 solution for quick, convenient repairs; best for smaller tool quantities

SUBMIT INFO



Fill out tool and user information at milwaukeetool.com/eservice

PRINT LABEL



Print a free FedEx shipping label for the Milwaukee Tool repair facility

GET TOOL



Your repaired tool will be returned directly to you – no need to pick it up

Lightning Max Repair (LMR)

- Non-Warranty repairs are processed through the LMR max rate price
- Guarantees that you only pay the actual cost of the repair and protects you if the repair cost exceeds the quoted LMR price



Factory Service Center

- Available for users who prefer a tool drop-off point
- Any tool repair volume
- 19 locations nationwide
- Certified Milwaukee parts and technicians



Authorized Service Center

- Available for end users who prefer a drop-off point
- Individual or small tool repair volume
- Not near a Factory Service Center
- Over 400+ locations nationwide
- Certified and trained to repair Milwaukee tools

Global Customer Service 1-800-SAWDUST

- Service Questions
- Product Questions
- Tool Application Questions
- Technical Support



Milwaukeetool.com

- Find a Service Center
- eService online form
- Warranty information
- Lightning Max Repair Info
- Parts pricing
- Manuals for all our tools



Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
0	Origination	Safety Div.	Vice President		08/01/12
N/A	No Changes	Safety Div.	Vice President	12/28/12	01/31/13
1	Added Sections on Portable & Fixed Grinders	Safety Div.	Vice President	05/15/13	01/31/14
N/A	No Changes	Safety Div.	Vice President	12/23/14	04/01/15
2	Compressed Air Safety Guidelines	Safety Div.	Safety Director	06/15/16	06/15/16
3	Update to Training Requirements Documentation Clarified that only OEM Authorized Representatives are allowed to perform training on Powder Actuated Tools Inclusion of Abrasive Grinding Wheels in Tool Safety Policy Update of Training Record Form – Removed Customer Specific Section, Added Abrasive Grinding Wheel Training Adding section on Cordless Power Tools Included Manufacturer's Guidelines on Lithium-Ion Battery Packs Added Portable Power Tool Risk Assessment Guide for use with THA's	Safety Div.	Warehouse Mgr./Fleet Mgr. & Safety Director	09/30/19	12/2019
4	Updated tool condition requirements Cutting tools added	Safety Div.	Safety Director	1/11/2022	1/2022



Thompson Electric, Inc.

49 Northmoreland Avenue • Munroe Falls, Ohio 44262

(330) 686-2300 F (330) 686-2362



Trenching & Excavating

2021 - 2022

Introduction

In the construction industry, excavation work such as trenching can be extremely hazardous. A trench is defined as a narrow excavation made below ground in which the depth is greater than the width, which is 15 feet or less.

The most common type of trenching accident, cave-in, is also the deadliest. Cave-ins are usually the result of unsafe work practices:

- Not using shoring;
- Using inadequate shoring;
- Excavating too close to a building or utility pole;
- Misjudging the stability of the soil;
- Vibrations caused by construction work; or
- Weather conditions that change the soil around the excavation.

General Requirements

- **Surface Encumbrances** – All surface encumbrances, such as trees, boulders, adjacent structures, utility poles, large equipment, etc. that are located so as to create a hazard to employees will be removed or supported as necessary to safeguard employees against cave-ins. **Underground Installations** – Before any excavation, underground installations must be determined and marked. This can be accomplished by either contacting the local utility companies or the local “one-call” center for the area. All underground utility locations must be documented on the proper forms. All overhead hazards (surface encumbrances) that create a hazard to employees must be removed or supported to eliminate the hazard.
 - If underground installations are uncovered, they will be properly supported to protect employees.
- **Access & Egress** – A stairway, ladder, ramp or other means of egress will be located in any trench that is 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.
 - **Ladders** must be secured at the top and extend a minimum of 36 inches above the top of the excavation.
 - **Metal ladders** should be used with extreme caution, particularly when electrical utilities are present.
 - **Structural ramps** may be designed by a “Competent Person” unless they are used by equipment. If this is the case, the design will be developed by a “Competent Person” **qualified** in structural design.
- **Vehicular Traffic** – Employees exposed to vehicular traffic shall be provided with and required to wear reflective vests or other suitable garments marked with or made of reflectorized or high-visibility materials.
 - **Trained flag persons** signs and barricades must be utilized to ensure the safety of employees, vehicular traffic, and pedestrians.
- **Exposure to Falling Loads** – All employees, subcontractors, and visitors on an Thompson Electric excavation site, must wear hard hats. (See Thompson Electric’ Personal Protective Equipment Policy).
 - Employees are not allowed to work under raised loads.
 - Employees are not allowed to work under loads being lifted or moved by heavy equipment used for digging or lifting.
 - Employees are required to stand away from equipment that is being loaded or unloaded to avoid being struck by falling materials or spillage.

- ❑ **Mobile Equipment** – The following steps should be taken to prevent vehicles from accidentally falling into the trench:
 - **Barricades** must be installed where necessary.
 - **Hand or mechanical signals** must be used as required.
 - **Stop logs** must be installed if there is danger of vehicles falling into the trench. Or a warning system shall be utilized (i.e., barricades, hand or mechanical signals)
 - **Soil should be graded away** from the excavation; this will assist in vehicle control and channeling of run-off water.
 - **Trenches left open overnight** shall be fenced and barricaded.
- ❑ **Stability of Adjacent Structures** – Support systems such as shoring, bracing or underpinning will be used to provide stability whenever the stability of adjoining buildings, walls or other structures is endangered by excavation operations.
- ❑ Employees should be spaced out in a trench unless there is a necessity of working together. They should also stay out of the immediate area of excavating equipment, and not work ahead of the shoring.
- ❑ When employees are working on hard surface roads, where a flow of traffic is being maintained, it is important that small stones be removed off the road. Stones are sometimes thrown with great speed by the tires of passing cars and can cause serious accidents.
- ❑ Broken arms and legs and other injuries can result when workers fall into construction trenches. They result because they fail to look where they are going, when they walk too close to the edge, or when they attempt to leap across the trench.
- ❑ Rocks and tools thrown near the edge of a trench are not only a hazard to employees working in the trenches, but can cause falls into the trench by employees working on the surface.
- ❑ Employees should use extra care when venturing near the edges of trenches and other excavations when the weather is bad and there are icy or muddy conditions.

Soil Classification & Identification

The OSHA Standards define soil classifications within the Simplified Soil Classification Systems, which consists of four categories: Stable rock, Type A, Type B, and Type C. Stability is greatest in stable rock and decreases through Type A and B to Type C, which is the least stable. Appendix A of the Standard provides soil mechanics terms and types of field tests used to determine soil classification

- ❑ **Stable Rock** – Natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.
- ❑ **Type A Soil** – Most Stable:
 - Cohesive soils with an unconfined compression strength of 1.5 tons per square foot (TSF) or greater.
 - Cemented soils like caliche and hardpan are considered Type A.
 - Soil is not type A if:
 - If is fissured;
 - The soil is subject to vibration form heavy traffic, pile driving or similar effects;
 - The soil has been previously disturbed;
 - The material is subject to other factors that would require it to be classified as a less stable material;
 - The exclusions for Type A most generally eliminate it from most construction situations.

- ❑ **Type B Soil – Medium Stability:**
 - Cohesive soil with an unconfined compressive strength greater than .5 TSF, but less than 1.5 TSF.
 - Granular cohesion-less soil including angular gravel, silt, silt loam, and sandy loam.
 - The soil has been previously disturbed except that soil classified as Type C soil.
 - Soil that meets the unconfined compressive strength requirements of Type A soil, but is fissured or subject to vibration.
 - Dry rock that is unstable.
- ❑ **Type C Soil – Least Stable:**
 - Cohesive soil with an unconfined compressive strength of .5 TSF or less.
 - Granular soils including gravel, sand and loamy sand.
 - Submerged soil or soil from which water is freely seeping.
 - Submerged rock that is not stable.
- ❑ **Layered Geological Strata (where soils are configured in layers) –** The soil must be classified on the basis of the soil classification of the weakest soil layer. Each layer may be classified individually if a more stable layer lies below a less stable layer (i.e., where a Type C soil rests on top of stable rock).
- ❑ Only the “Competent Person” in charge of the excavation may classify the soil as other than a type C, according to the Testing Methods outlined in this policy and procedure.

Soil Testing Methods

- ❑ The “Competent Person” will classify the soil on the basis of at least one visual and one manual analysis.
- ❑ These tests should be run on freshly excavated samples from the excavation and are designed to determine stability based on a number of criteria:

▪ Cohesiveness	▪ Presence of Fissures
▪ Presence & Amount of Water	▪ Unconfined Compressive Strength
▪ Duration of Exposure	▪ Undermining
▪ Presence of Layering	▪ Prior Excavation & Vibration

- ❑ **Visual Test –** The “Competent Person” should perform a visual test to evaluate the conditions around the site. In a visual test, the entire excavation site is observed, including the soil adjacent to the site and the soil being excavated. The “Competent Person” should also check for vibration.
 - During the visual test, the “Competent Person” should check for crack-line openings along the failure zone that would indicate tension cracks, look for existing utilities that indicate that the soil has been previously disturbed, and observe the open side of the excavation for indications of layered geologic structuring.
 - This person should also look for signs of bulging or sloughing, as well as for signs of surface water seeping from the sides of the excavation or from the water table.
 - The area adjacent to the excavation should be checked for signs of foundations or other intrusions into the failure zone, and the evaluator should check for surcharging and the spoil distance from the edge of the excavation.

❑ **Manual Tests:**

- **Thumb Penetration Test** – Attempt to press the thumb firmly into the soil in question. If the thumb penetrates the full length of the nail, it is probably Type B soil. If the thumb penetrates the full length of the thumb, it is Type C soil. It should be noted that the thumb penetration test is the least accurate testing method.
 - **Dry Strength Test** – Take a sample of dry soil. If it crumbles freely or with moderate pressure into individual grains it is considered granular (Type C). Dry soil that falls into clumps that subsequently break into smaller clumps (and the smaller clumps can only be broken with difficulty) it is probably clay in combination with gravel, sand, or silt (Type B).
 - **Plasticity or Wet Thread Test** – Take a moist sample of the soil. Mold it into a ball and then attempt to roll it into a thin thread approximately 1/8 inch in diameter by 2 inches in length. If the soil sample does not break when held by one end, it may be considered Type B.
 - **Pocket Penetrometer Test** – This instrument is most accurate when soil is nearly saturated. This instrument will give unconfined compressive strength in tons per square foot.
 - **Pocket Penetrometer Test (cont.)** – The spring operated device uses a piston that is pushed into a coil up to a calibration groove. An indicator sleeve marks and retains the reading until it is read. The reading is calibrated in tons per square foot (TSF) or kilograms per cubic centimeter.
 - **Shearvane Test** – Measures the approximate shear strength of saturated cohesive soils. The blades of the vane are pressed into a flat section of undisturbed soil, and the knob is turned slowly until soil failure. The dial is read directly when using the standard vane. The results will be in tons per square foot or kilograms per cubic centimeter.
- ❑ The “Competent Person” will perform several tests of the excavation to obtain consistent, supporting data along its depth and length. The soil is subject to change several times within the scope of an excavation and the moisture content will vary with weather and job conditions. The “Competent Person” must also determine the level of protection based on what conditions exist at the time of the test, and allow for changing conditions.

Excavation Protection Systems

- ❑ All excavations or trenches 5 feet or greater in depth shall be appropriately benched, shored, or sloped according to the procedures and requirements set forth in OSHA’s Excavation Standard, 29 CFR 1926.650, .651, and .652.
- ❑ Excavations or trenches 20 feet deep or greater must have a protective system designed by a Registered Professional Engineer.
- ❑ Excavations under the base of footing of a foundation or wall require a support system designed by a Registered Professional Engineer.
- ❑ Sidewalks and pavement shall not be undermined unless a support system or another method of protection is provided to protect employees from their possible collapse.
- ❑ **Sloping** – Maximum allowable slopes for excavations less than 20’ based on soil type and angle to the horizontal are as follows:

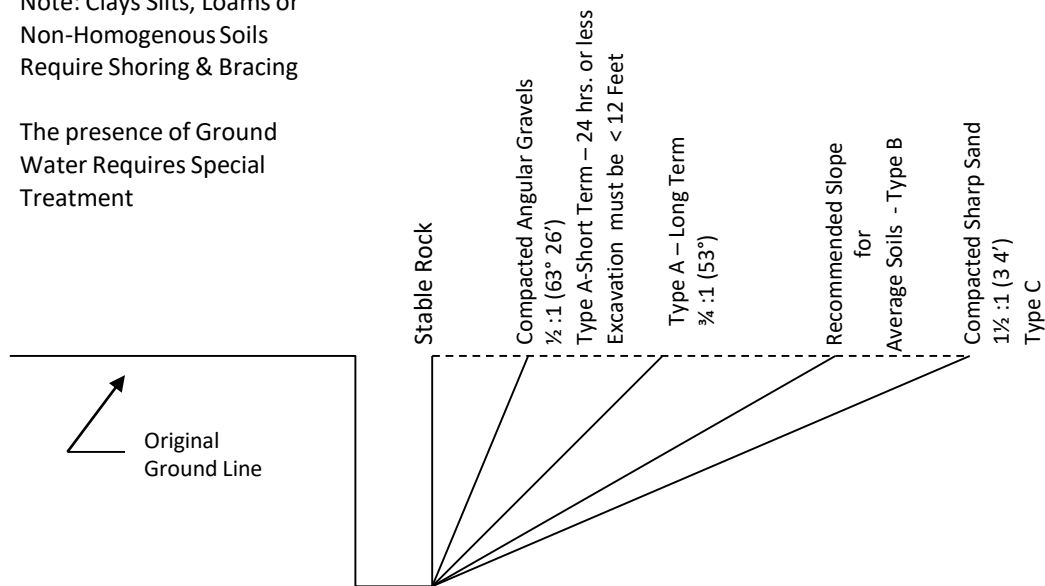
Soil Type	Height/Depth Ratio	Slope Angle
Type B	1:1	45 degrees
Type C	1½ : 1	34 degrees

- A 10-foot-deep trench in Type B soil would have to be sloped to a 45-degree angle, or sloped 10 feet back in both directions. Total distance across a 10-foot-deep trench would be 20 feet, plus the width of the bottom of the trench itself.
- In Type C soil, the trench would be sloped at a 34-degree angle, or 15 feet back in both directions for at least 30 feet across, plus the width of the bottom the trench itself. (See *Illustration 1*)

Illustration 1: Approximate Angle of Repose for Sloping of Sides of Excavations

Note: Clays Silts, Loams or
Non-Homogenous Soils
Require Shoring & Bracing

The presence of Ground
Water Requires Special
Treatment



All sloping systems for excavations 5 to 20 feet in depth must be constructed under the instruction of the designated “Competent Person”.

- ❑ **Benching** – Benching *is not* allowed in Type C soil.
 - In Type B soil, the vertical height of the benches must not exceed 4 feet. Benches must be below the maximum allowable slope for that soil type. In other words, a 10-foot deep trench in Type B soil must be benched back 10 feet in each direction, with the maximum of a 45-degree angle.
 - Benching systems for excavations 5 to 20 feet in depth must be constructed under the instruction of the designated “Competent Person”.
- ❑ **Shoring/Shielding** is used when the location or depth of the cut makes sloping back to the maximum allowable slope impractical. Shoring utilizes a framework of vertical members (uprights), horizontal members (whales), and cross braces to support the sides of the excavation to prevent a cave-in. Metal (aluminum) Hydraulic, mechanical or timber shorings are common examples.
 - All shoring shall be installed from the top down and removed from the bottom up.
 - When bracing or shoring of trenches is required, such bracing and shoring shall be carried along with the excavation.
 - Cross braces or trench jacks shall be placed in true horizontal position, be spaced vertically, and be secured to prevent sliding, falling, or kick-outs.

- Shoring Timbers, or wales, should not be used as supports for platforms to carry concrete mixtures or other heavy equipment. If it is necessary for a mixer to be over a trench, vertical supporting members should be cut in-between the wales, and the load transmitted to the ground through additional vertical members from the bottom wale.
- Backfilling and removal of trench supports shall progress together from the bottom of the trench. Jacks or braces shall be released slowly, and, in unstable soil, employees shall clear the trench before pulling out the jacks or braces with ropes.
 - **Timber Shoring** - Minimum requirements for trench bracing and shoring shall be in accordance with Appendix B to this rule.
 - The vertical planks in the bracing system shall extend at least to the top of the trench face
 - The members of the shoring system that are to be selected using the tables are the cross braces, the uprights, and the wales where wales are required. The Competent Person shall select the size and spacing of members using the appropriate table. The selection is based on the depth and width of the trench where the members are to be installed. In most instances, the selection is also based on the horizontal spacing of the cross braces. Where a choice is available, the horizontal spacing of the cross braces must be chosen before the size of any member can be determined.
- Braces and diagonal shores in a wood shoring system shall not be subjected to compressive stress in excess of values given by the following formula:

$$S = 1300 - \frac{20L}{D} \qquad \text{Maximum Ratio: } \frac{L}{D} = 50$$

Where: L = Length, unsupported, in inches. D

= Least side of the timber in inches.

S = Allowable stress in pounds per square inch of cross section.

- ❑ **Hydraulic (Aluminum) Shoring provides** a critical safety advantage over timber shoring because workers do not have to enter the trench to install them. They are also light enough to be installed by one worker; they are gauge-regulated to ensure even distribution of pressure along the trench line; and they can be adapted easily to various trench depths and widths.
 - The top cylinder of hydraulic shoring shall be no more than 18 inches below the top of the excavation.
 - The bottom of the cylinder shall be no higher than 4 feet from the bottom of the excavation. (2 feet of trench wall may be exposed beneath the bottom of the rail or plywood sheeting, if used.)
- 3 vertical shores, evenly spaced must be used to form a system.
- Wales are installed no more than 2 feet from the top, no more than 4 feet from the bottom, and no more than 4 feet apart, vertically.
- Hydraulic shores must be installed with sheeting in accordance with Appendix C.



- ❑ **Shielding (Trench Boxes)** – Unlike sloping and shoring, shielding does not prevent cave-in. Shields are designed to withstand the soil forces caused by a cave-in and protect the employees inside the structure. Most shields consist of two flat parallel metal walls that are held apart by metal cross braces.
- Shielding design and construction is not covered by OSHA Standards. Shields must be certified in design by a registered professional engineer and must have either a registration plate on the shield or registration papers from the manufacturer on file at the worksite. ***Any repairs or modifications must be approved by the manufacturer.***



- The excavated area between the outside of the trench box and the face of the trench should be as small as possible. The space between the trench box and the excavation side must be backfilled to prevent lateral movement of the box. Shields may not be subjected to loads exceeding those, which the system was designed to withstand.
- Trench boxes are generally used in open areas, but they also may be used in combination with sloping and benching.
- Shields must not have any lateral movement when installed.
- The shield must extend at least 18 inches above the point where proper sloping begins (the height of the shield must be greater than the depth of the excavation).
- Shields may ride 2 feet above the bottom of an excavation, provided they are calculated to support the full depth of the excavation and there is no caving under or behind the shield.
- Employees will be protected from cave-ins when entering and exiting the shield (i.e., ladder within the shield or a properly sloped ramp at the end).
- Employees are not allowed in the shield during installation, removal, or during any vertical movement.
- The open end of the shield must be protected from the exposed excavation wall. The wall must be sloped, shored, or shielded. Engineer designed end plates can be mounted on the ends of the shield to prevent cave-ins.

Hazardous Atmospheres and Confined Spaces

- ❑ Employees shall not be permitted to work in hazardous and/or toxic atmospheres. Such atmospheres include those with:
 - Less than 19.5% oxygen;
 - A combustible gas concentration greater than 20% of the lower flammable limit; and
 - Concentrations of hazardous substances that exceed those specified in the Threshold Limit Values for airborne contaminants established by the American Conference of Governmental Industrial Hygienists (ACGIH).
- ❑ All operations involving such atmospheres must be conducted in accordance with OSHA requirements for occupational health and environmental controls for personal protective equipment and for lifesaving equipment. Engineering controls (i.e., ventilation) and respiratory equipment may be required.

- ❑ When **internal combustion engines** are used in or near trenches, precautions should be taken against exhaust gases entering the trenches. Where necessary, ducts should be attached to the exhaust to conduct the gases away from the trench.
- ❑ **Testing for Atmospheric Contaminants** – If there is any possibility that the trench or excavation could contain a hazardous atmosphere (i.e., trenching in the vicinity of gasoline storage tanks, underground pipelines or sewer lines, a landfill area), atmospheric testing must be conducted, by a “Competent Person” prior to entry.
 - Testing should be conducted not only before employees enter the trench, but regularly to ensure that the trench remains safe. The frequency of testing should be increased if equipment is operating in the trench.
 - Testing frequency should also be increased if welding, cutting, or burning is done in the trench.
 - Employees required to wear respiratory protection, must be trained, fit-tested, and enrolled in Thompson Electric’ respiratory protection program.
 - Some trenches qualify as confined spaces. When this occurs, compliance with Thompson Electric’ Confined Space program is required.

Standing Water and Water Accumulation

- ❑ Methods for controlling standing water and water accumulation must be provided and should consist of the following, if employees must work in the excavation.
 - Use of special support or shield systems approved by a registered professional engineer.
 - Water removal equipment, such as well pointing, used and monitored by a “Competent Person”.
 - Safety harnesses and lifelines, used in accordance with Thompson Electric’ Fall Protection program.
 - Employees removed from the trench during rainstorms.
 - Trenches carefully inspected by a “Competent Person” after each rain and before employees are permitted to re-enter the trench.
- ❑ **Working below the water line** – In these conditions, in order to guard against an unstable excavation bottom, sheeting may have to be driven below the bottom of such an excavation to add to the soil stability.
- ❑ **Diversion Dikes and ditches** or other suitable means will be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Water causes soil erosion and softening and should not be allowed to accumulate in a trench or excavation.

Superimposed Loads and Vibrations

- ❑ Superimposed loads in the vicinity of a trench or excavation will increase the pressure on excavation walls. Heavy equipment and materials such as pipes or timbers will be kept as far back from the excavation as possible.
- ❑ When heavy loads must be located near an excavation, the walls must be braced, sheet-piled, or shored to safely support the extra weight. In some cases it may be necessary to lessen the pressure of these loads.
- ❑ Buildings, curbs trees, utility poles and other structures adjoining the excavation area also can place more stress on a trench side than it can safely accommodate. In these instances, Thompson Electric requires that shoring, bracing, or underpinning be provided as necessary not only to protect workers, but also to prevent the dislocation of the soil beneath the structures in the vicinity.
- ❑ **Spoil** – Temporary Spoil, the excavated material, can exert great pressure on the excavation walls.
 - Temporary spoil shall be placed no closer than 2 feet from the surface edge of the excavation, measured from the nearest base of the spoil to the cut. This distance should not be measured

from the crown of the spoil deposit. This distance requirement ensures that loose rock or soil from the temporary spoil pile will not fall on employees in the trench.

- Spoil should be placed so that it channels rainwater and other run-off water away from the excavation. Spoil should be placed so that it cannot accidentally run, slide, or fall back into the excavation.
 - **Permanent Spoil** should be placed at a much greater distance from the excavation. ***This distance will be determined by the “Competent Person”.***
- ❑ **Vibrations** or sudden shock from passing vehicles or railways, blasting, equipment such as trucks or pile drivers, and some tools can create enough vibration to endanger a shoring system. If these conditions exist near an excavation site, stronger support is vital.

Surface Crossing of Trenches

- ❑ Surface crossing of trenches should not be made unless absolutely necessary. However, if necessary, they are only permitted under the following conditions:
- **Vehicle crossings** must be designed by and installed under the supervision of a Registered Professional Engineer.
- ❑ **Walkways or bridges must:**
- Have a minimum clear width of 20 inches.
 - Be fitted with standard guardrails (as outlined in Thompson Electric’ Fall Protection Plan).
 - Extend a minimum of 24 inches past the surface edge of the trench.
- ❑ **“Jump-Overs”** of trenches are strictly prohibited on any Thompson Electric worksite.

Inspections

- ❑ **Daily Inspection** of excavations, the adjacent areas and protective systems shall be made by the “Competent Person” for evidence of a situation that could result in a cave-in, indications of failure of protective systems, hazardous atmospheres or other hazardous conditions.
- ❑ **The “Competent Person”** shall conduct inspections:
- Daily and before the start of each shift.
 - As dictated by the work being done in the trench.
 - After every rainstorm.
 - After other events that could increase hazards, such as snowstorm, windstorm, thaw, earthquake, dramatic change in weather, etc.
 - When fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom, or other similar conditions occur.
 - When there is a change in the size, location, or placement of the spoil pile.
 - When there is any indication of change or movement in adjacent structures.
- ❑ **Whenever a possible hazardous condition** is detected, the “Competent Person” will instruct exposed employees to immediately leave the excavation or trench until an adequate means of protection is provided.
- ❑ A **“Daily Excavation Inspection Form”** shall be completed for excavations 4 feet or greater in depth.
- All documented inspections will be kept on file in the worksite safety files and forwarded to the President weekly.

Competent Person

- ❑ The OSHA Standards require that the ***“Competent Person”*** must be capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and have authorization to take prompt corrective measures to eliminate them and if necessary, to stop the work.
- ❑ A “Competent Person” is required to:
 - Have a complete understanding of the applicable safety standards and any other data provided (29 CFR 1926 Subpart P).
 - Assure the proper locations of underground installations or utilities, and that the proper utility companies have been contacted.
 - Conduct soil classification tests and reclassify soil after any condition changes.
 - Determine adequate protective systems (sloping, shoring, and shielding systems) for employee protection.
 - Conduct all air monitoring for potential hazardous atmospheres and have the ability to detect and deal with other hazards associated with confined spaces.
 - Conduct daily and periodic inspections of excavations and trenches.
 - Approve design of structural ramps, if used.
 - Have the authority to take prompt corrective measures to eliminate existing and predictable hazards and to stop work when required.
- ❑ Each site covered in this procedure will have a Competent Person who will evaluate conditions and remain at the site as long as employees are working in the trench or excavation
- ❑ The Competent Person will evaluate the work site prior to excavation and determine what utilities will be affected. Utility companies will be notified at least 48 hours prior to starting work unless emergency conditions exist.
- ❑ The Competent Person will choose either sloping or shielding/shoring as the protective system.
- ❑ The Competent Person will inspect and document the condition of the trench or excavation and protective system prior to each work shift, throughout each work shift, and after a rainstorm or other hazard-increasing event.
- ❑ If a hazard is detected, the Competent Person will not permit employees to enter or will immediately remove employees from the trench or excavation until proper protective measures have been taken.
- ❑ The Competent Person will ensure mobile equipment working near the edge of a trench or excavation has a positive warning system such as stop logs or hand signals.
- ❑ The Competent Person will ensure that testing with a multigas meter is conducted whenever the possibility of atmospheric hazards in the trench or excavation exists.
- ❑ The Competent Person will ensure that information on the site evaluation and protective system selected is available on-site.

Competent Person Job Reminder Checklist

Date	Name of Competent Person	Name of RPE (If Applicable):
Project I.D. No./Name	Physical Location of Project	
Pre-Inspect Jobsite		
What is the best protection method? (i.e., sloping, shoring, shielding)		
How likely are utilities?		
What additional equipment is necessary?		
Is water removal needed?		
Will air monitoring be required?		
Ladders?		
Soil Testing?		
Stop logs?		
Employee and Equipment Access		
Employee ramp designed by Competent Person.		
Equipment ramp designed by person qualified in structural design.		
Exit means located within 25' of employees and securely attached.		
Determine Soil Conditions		
All soil is to be classified as type "C" and proper protection used based on "C".		
Record results on testing record.		
Inspect excavation for changing soil conditions.		
Protection Systems		
Appropriate protection system selected.		
Installed according to manual or tabulated data.		
Inspect equipment at start of shift		
Remove employee(s) working outside protected area(s).		
Monitor Environment Conditions		
Remove employees from trench where water is accumulating.		
Monitor use of water removal equipment.		
Monitor air quality levels if hazardous atmospheres are suspected.		
Required to Consult w/Registered Professional Engineer (RPE) When:		
Trenches are over 20' deep.		
Specifically designed shoring or bracing is required.		
Excavation or trench endangers nearby structure.		
Standard protection measures cannot be used.		
May Consult With RPE When:		
Unusual or changing soil conditions exist or are anticipated.		
Soil is unusually good and shoring reduction is required.		
Soil is unusually poor and may require going to a more protective system.		
Notes:		

Soil Analysis Checklist

Date		Name of Competent Person			Weather Conditions		
Project I.D. No./Name		Physical Location of Project					
Where was sample taken from?				Excavation length, depth & width		L:	D:
Visual Test							
Particle Type		Fine Grained (Cohesive)		Granular (Sand/Silt or Gravel)		Other (Describe)	
Notes:							
Water Conditions		Wet	Dry	Seeping Water	Surface Water Present	Submerged	
Notes:							
Yes	No	N/A	Description				
			Layered Soils Dipping excavation? If yes, describe:				
			Excavation exposed to vibrations? If yes, describe:				
			Previously disturbed soils?				
			Crack like openings or sprawlings observed?				
			Underground Utilities? If yes, what type?				
			Layered Soils? (Note: The least stable layer controls the soil type)				
Manual Test							
Plasticity		Cohesive	Non-Cohesive	Dry Strength	Cohesive (broken w/difficulty)		Granular
Wet Shake		Water comes to surface (granular material)			Surface remains dry (clay material)		
Thumb Test (Used to estimate unconfined compression strength of cohesive soil)							
Test Performed		Yes	No	N/A, Explain:			
Soil indented by thumb with very great effort?						Type A	
Soil indent by thumb with some effort?						Type B	
Soil easily penetrated several inches by thumb with little or no effort. NOTE: If soil is submerged, seeping water, subjected to surface water, runoff, exposed to wetting.						Type C	
Penetrometer or Shearvane Test (Used to estimate unconfined compressive strength of cohesive soils.)							
Test Performed		Yes	No	Device Used/Serial Number:			
Soil with unconfined compressive strength of 1.5 tsf or greater.						Type A	
Soil with unconfined compressive strength of greater than 0.5 tsf and less than 1.5 tsf.						Type B	
Soil with unconfined compressive strength of 0.5 tsf or less. NOTE: If the soil is submerged, seeping water, subjected to surface water, runoff, exposed to wetting.						Type C	
Soil Classification							
Stable Rock		Type A		Type B		Type C	
Selection of Protective System (Refer to Appendix F of 29 CFR 1926)							
Sloping (Appendix B)		Timber Shoring		Trench Shield		Hydraulic Shoring	
Specify Angle:		(Appendix C)		Max. depth in this soil:		(Appendix D)	
Additional Notes or Comments:							

**Keep one copy of each Soil Analysis Checklist on site for project duration.
Forward the original to the main office**

Daily Excavation Safety Checklist

NOTE: Trenches over 4 feet in depth are considered excavations. Any items marked NO on this form MUST be remediated prior to any employees entering the excavation.						
Date		Name of Competent Person		Weather Conditions Approx. Temp.		Approx. Wind Dir.
Project I.D. No./Name		Physical Location of Project				
Soil Classification			Excavation length, depth & width		L:	D:
Protective System Used						
Activities in Excavation						
Excavation > 4 feet deep? ☐ Yes ☐ No If Yes, fill out a Confined Space Permit Prior to Any person entering the excavation.						
Yes	No	N/A	Description			
			Employees protected from cave-ins & loose rock/soil that could roll into the excavation.			
			Spoils, materials & equipment set back at least 2 feet from the edge of the excavation.			
			Engineering designs for sheeting and/or manufacturer's data on trench box capabilities of site.			
			Adequate signs posted and barricades provided			
			Training (toolbox meeting) conducted w/employees prior to entering excavation.			
Utilities						
			Utility company contacted and given 24 hours notice and/or utilities already located & marked.			
			Overhead lines located, noted and reviewed with operator.			
			Utility locations reviewed with the operator, & precautions taken to ensure contact does not occur.			
			Utilities crossing the excavation supported, and protected from falling materials.			
			Underground installations protected, supported or removed when excavation is open.			
Wet Conditions						
			Precautions taken to protect employees from water accumulation (continuous dewatering).			
			Surface water or runoff diverted/controlled to prevent accumulation in the excavation.			
			Inspection made after every rainstorm or other hazard increasing occurrence.			
Hazardous Atmospheres						
			Air in the excavation tested for oxygen deficiency, combustibles, and other contaminants.			
			Ventilation used in atmospheres that are oxygen rich/deficient &/or contains hazardous substances.			
			Ventilation provided to keep LEL below 10%			
			Emergency equipment available where hazardous atmospheres could or do exist.			
			Safety Harness and lifeline used.			
			Supplied air necessary (if yes, contact President).			
Entry & Exit						
			Exit (i.e., ladder, sloped wall) no further than 25 feet from ANY employee.			
			Ladders secured and extend 3 feet above the edge of the trench.			
			Wood ramps constructed of uniform material thickness, cleated together @ bottom.			
			Employees protected from cave-ins when entering or exiting the excavation.			

Revision Number	Description of Change	Written By	Approved By	Revision Date	Effective Date
	Origination	Issued By	Authorized By		08/01/12
01	Added General Foreman & specific duties & responsibilities throughout the policy	Safety Div.	Vice President	12/28/12	01/31/13
02	Added Section on Testing for Atmospheric Contaminants	Safety Div.	Vice President	05/15/13	01/31/14
N/A	No Changes or Additions	Safety Div.	Safety Div.	01/2020	01/2020
03	Annual Review – No Changes	Safety Div.	Management w/Safety	09/2020	09/2020
04	Testing methods and inspections updated	Safety Div.	Management w/Safety	12/2021	12/2021



This safety policy and procedure is established in accordance with Occupational Safety and Health Standards for Construction Industry (29 CFR 1926.25). This policy and procedure shall apply to any and all employees, subcontractors and/or vendors at any and all TEI work-site locations.

General Waste Management

Housekeeping & Spill Response
Guidelines Only

Introduction

Thompson Electric, Inc. (herein referred to as TEI) work-sites can present many hazards to employees when they are performing construction-related activities. Housekeeping is not just cleanliness. It includes keeping work areas neat and orderly; maintaining halls and floors free of slip and trip hazards; and removing of waste materials (i.e., paper, cardboard, scrap lumber, recyclable materials, etc.) and other fire hazards from work areas. It also requires paying attention to important details such as the layout of the whole workplace, aisle marking, the adequacy of storage facilities, and maintenance. Good housekeeping is the basic part of not only accident and fire prevention but an effective waste management program.

- TEI believes that effective waste management begins in the planning stage with the Project Manager and General Superintendent. Prior to mobilization Management will address matters concerning the staging and planning of removal of scrap materials, wastes, trash, recyclable materials (and how they shall be separated) as well as the obtaining/providing of the proper receptacles and their timely removal when full.

Effective housekeeping is an ongoing operation. It is not a hit-and-miss cleanup done occasionally. Periodic “panic” cleanups are costly and ineffective in reducing accidents.

TEI requires conformance with the safety standards set here in. A site-specific program shall be utilized, providing it meets or exceeds the requirements set forth in this manual.

Policy

It is the policy of TEI to provide a place of employment that is free from recognized hazards that cause, or are likely to cause, death or serious physical harm to employees or the public. Therefore, all employees on TEI worksites will practice good housekeeping to further reduce hazards to employees.

It is the responsibility of each manager/unit head, supervisor, and employee to ensure implementation of TEI’s safety policy, and procedure on Waste Management and Housekeeping. It is also the responsibility of each TEI employee to report immediately any unsafe act or condition to his or her supervisor. Specific responsibilities are further addressed in the site specific Emergency Action Plan or daily Task Hazard Analysis.

Training

Employees will be trained in the site specific housekeeping and waste management plan. This shall include but not be limited to:

- Proper separation, labeling and disposal of scrap material (i.e., type and approved form of containment)
- How to properly handle, label and store all site related waste material to minimize the potential for a spill or impact to the environment.
- Proper separation, labeling and disposal of non-hazardous waste (i.e., trash).
- Proper handling, separation, labeling, storage and disposal of hazardous waste.
 - This training shall include related Job Hazard Analysis, required Personal Protective Equipment, Customer site specific requirements, and proper spill response.
- Employees shall be instructed on the proper response procedures for spilled materials (i.e., hazardous and non-hazardous). The training shall include materials available for use, proper waste labeling, storage and disposal, communication procedures (i.e., may be customer specific).
- All training and re-training must be documented; Name of employee, name and status of instructor, date of training, subject(s) successfully completed.

Dust & Dirt Removal

On some work sites, enclosures and exhaust ventilation systems may fail to collect dust, dirt, and chips adequately. Vacuum cleaners are suitable for removing light dust and dirt. Industrial models have special fittings for cleaning walls, ceilings, ledges, machinery, and other hard-to-reach places where dust and dirt may accumulate.

Dampening floors or using sweeping compounds before sweeping reduces the amount of airborne dust. The dust and grime that collect in places like shelves, piping, conduits, light fixtures, reflectors, windows, cupboards and lockers may require manual cleaning.

Special purpose vacuums with HEPA (high efficiency particulate air) filters will be used for the clean-up and removal of hazardous substances (i.e., particles of asbestos, lead or fiberglass).

Compressed air will not be used for removing dust, dirt or chips from equipment, work surfaces or clothing.

Construction Scrap & Debris

During the pre-job planning TEI's assigned Project Manager shall review the project's scope of work (i.e., demolition, parts/materials list) and estimate the amount and different types of waste that will be generated as well as the modes of separation (i.e., trash, scrap, lumber, copper, etc.) containment, and scheduling of waste removal by approved means is included in the site specific operating plan and safety related job hazard analysis. Consideration shall also be given to environmental impact as it relates to the waste and scrap materials generated by a specific job site and work scope.

Scrap material and debris generated during construction usually consist of:

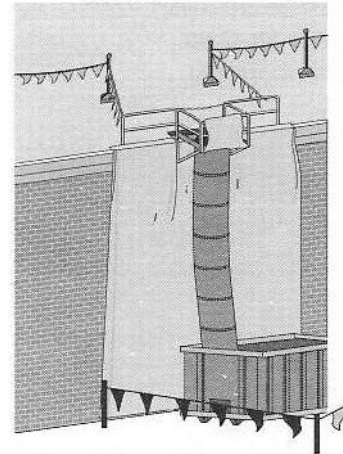
- Non-combustible scrap material and debris; and
- Combustible scrap material and debris.

Non-combustible scrap material and debris that consist of form and scrap lumber with protruding nails, and all other debris, must be kept cleared from work areas, passageways, and stairs, and from around buildings or other structures.

Nails are to be removed from used lumber before stacking. Combustible scrap and debris must be removed at regular intervals during the course of construction without increasing the hazard exposure to employees who remove such debris.

Disposal from Elevated Surfaces

Anytime materials need to be dropped 20 feet or more on the outside of a building, they must be sent down an enclosed chute. An enclosed chute is defined as a slide, closed in on all sides, through which materials are removed from a roof or other elevated area. If materials are being dropped on the inside of a building through a hole in the floor without a chute, the area below should be completely barricaded. The barricades have to be at least 42 inches high and 6 feet back from the protected edges of the opening above. All scraps, waste, and trash have to be removed from the immediate work area on a regular basis. However the waste that accumulates on the lower level should not be removed until the end of the work shift. Removing waste throughout the work shift would require workers on different levels to communicate with one another, possibly creating dangerous situations to do so.



All noncombustible materials and large debris, such as that from roof system tear-offs, can be disposed of in an on-site dumpster. When placing a dumpster at a work site, the following precautions should be considered:

- Place dumpster away from doors and windows to prevent any discarded material from falling or blowing into buildings and causing damage or injury.
- If possible, place the dumpster on a solid flat surface so it does not cause damage to the building grounds or sink into soft ground, which could render it difficult to move or empty.
- Erect barricades around the dumpster to prevent people from wandering into an area where debris might be falling from the roof, especially if the roof is less than 20 feet high and a chute is not required.

Construction Waste Disposal

The regular collection, grading and sorting of scrap contributes to good housekeeping and waste management practices. It also makes it possible to separate materials that can be recycled from those going to waste disposal facilities.

All construction waste must first be collected into containers before disposal. The categories of construction waste generated at a construction site include:

- General waste and trash (non-toxic, non-hazardous);
- Recyclable waste; and
- Hazardous waste.

Separate containers must be provided for the collection and separation of waste, trash, and other refuse. These containers will be placed near where the waste is produced to aid in the proper separation and collection of generated scrap. All scrap containers will be clearly labeled (i.e., glass, plastic, scrap metal, etc.) and have a tight fitting lid/cover to prevent dispersion of the waste materials and to control the potential for run-off.

Additional separate containers must be provided with lids for hazardous wastes to prevent sparks or other ignition sources from coming into contact with hazardous waste. Hazardous wastes can include used oil, used oil filters, oily rags and flammable wastes as well as caustics, acids, harmful dusts, etc.

Absorbent that is used to collect incidental used oil spills and oil rags can be disposed of in waste collection dumpsters. Used oil filters must be drained of oil before they can be disposed into separate waste containers.

Storage

Organization of stored materials is essential for overcoming material storage problems. Reducing the amount of handling of materials will also reduce the risk of strain and sprain injuries, especially if manual materials' handling is required. The location of the stockpiles should not interfere with work but they should be readily available when required. Stored materials should allow a minimum of 3 feet of clear space under sprinkler heads.

Stacking cartons and drums on a firm foundation and cross tying them (where necessary) reduces the chance of their movement. Stored materials should not obstruct aisles, stairs, exits, fire equipment, emergency eyewash fountains, emergency showers, or first aid stations. All storage areas should be clearly marked.

Flammable, combustible, toxic and other hazardous materials are to be stored in approved containers in designated areas that are appropriate for the different hazards that they pose. Storage of materials should meet all requirements specified in the fire codes and the regulations of environmental and occupational health and safety agencies in the jurisdiction.

Spill Control

- The best way to control spills (i.e., chemical, waste) is to stop them before they happen. Regularly cleaning and maintaining machines and equipment is one way. Another is good housekeeping and best management practices. Others include but are not limited to:
 - Chemical substances shall be properly labeled then stored in an organized fashion, in approved/proper containers to minimize the potential for a spill. Whenever possible, chemicals should be kept in closed containers and stored so they are not exposed to storm water. Items utilized to aid in the prevention of chemical spills can include; drip pans, guards and **secondary containment**.
- When spills do occur, it is important to clean them up immediately. Absorbent materials are useful for wiping up greasy, oily or other liquid spills. Used absorbents must be disposed of as hazardous waste.
 - A spill response kit shall be readily available at each chemical or hazardous waste storage site and shall contain the appropriate supplies for the materials in that area that may be spilled.
 - Supplies must be easily accessible when required and considerations shall be made for both the type and quantity of materials needed during staging.
 - Questions or requests for guidance are to be directed to the Site Supervisor for clarification. All spill response kits shall be inspected on a regular and frequent basis by the Site Supervisor or designee to ensure that they are always fully stocked and readily available.

Communication Procedures

The information below provides a brief summary of instructions of immediate action following the discovery of an accidental release of materials (i.e., spill) of all materials (i.e., hazardous and non-hazardous) on a TEI work site.

- Two-way radios or cell phones shall be used when work teams do not have ready access to a customer's paging system. The agreed upon manner of communication shall be established during the site specific orientation training.
- Immediately upon discovering that a spill has occurred or has the potential to occur, employees shall notify the Site Supervisor or designee. The individual reporting the incident shall provide as much information as possible regarding the type, nature and location of the spill. The SITE SUPERVISOR OR DESIGNEE will dispatch employees specifically trained (by work site) in the control of small and incidental spills and leaks which are non-emergencies or Level One emergencies. All persons present shall evacuate the area containing the spill and should prevent others from entering the area until the SITE SUPERVISOR OR DESIGNEE gives the "All Clear".
- Initial Action:
 - Upon receiving a call about an incident, the SITE SUPERVISOR OR DESIGNEE will investigate. The SITE SUPERVISOR OR DESIGNEE will notify the customer's Project Management Team or their assigned Chemical Hygiene Officer immediately. The Chemical Hygiene Officer will immediately assess the reported emergency and inform the SITE SUPERVISOR OR DESIGNEE of the exact nature of the incident. The assessment will evaluate the following:
 - Nature and scope of the problem.
 - Steps necessary to protect life, health, environment, and customer operations.
 - Whether outside emergency responders are needed.
- Small and incidental spills and leaks (Level One) will be handled in-house.
- Larger incidents, characterized as Level Two or Level Three emergency will necessitate the activation of the site specific Emergency Plan. The Chemical Hygiene Officer will alert all relevant parties (i.e., local or outside emergency response teams), in an order and manner chosen and executed by them to respond to the incident.

Water

- **Potable water** is water that meets the quality standards prescribed in the U.S. Public Health Service Drinking Water Standards, or water that is approved for drinking purposes by the state or local authority having jurisdiction.
- Although OSHA does not indicate how much drinking water is required at a work site, OSHA does mandate that an adequate supply of drinking water always is available to employees.
- It must be in a container that is tightly closed and has a tap; water cannot be "dipped".
- The container has to be clearly marked and not used for any other purpose.
- A standard container with single-use cups, as well as a trash receptacle for used cups, must be provided.
- **Non-Potable water** is not meant for drinking but for industrial or firefighting purposes. There cannot be any cross-connections between systems providing potable and non-potable water. Non-potable water must be clearly labeled to indicate that the water is not safe for drinking, washing, or cooking.
 - Caution signs can be used to mark water as non-potable. According to Subpart G of 29 CFR 1926, the upper panel must be black with yellow "CAUTION" lettering; the lower panel is to be yellow with any wording added in black. The colors must conform to ANSI 53.1-1967.



Toilets & Washing Facilities

Unless access or transportation to nearby toilet facilities is readily available, toilets must be supplied for employee use. Under temporary field conditions, one toilet must be provided for 20 or fewer employees. For every additional 20 employees, one toilet and one urinal must be provided. If a job site does not have a sanitary sewer, the standard requires that one of the following should be provided unless prohibited by local codes:

- Chemical toilets (most commonly used at construction sites);
- Recirculating toilets;
- Combustion toilets.

Sanitary washing facilities are to be provided in any situation in which employees are working with harmful contaminants. The facilities need to be adequate for employees to remove such substances and near the work site.

Change Rooms

Whenever employees are required by OSHA regulations (i.e., lead, asbestos, silica exposure) or another government agency's established regulations to change from their street clothes and don protective clothing, change rooms/areas must be provided. The change rooms/areas must have storage facilities for street clothes and separate facilities for protective clothing.

Specific Responsibilities

Management:

- Ensuring that containers, sanitary facilities, sufficient water, and other supplies to maintain effective housekeeping, are purchased and readily available at construction sites.
- Obtaining and coordinating the required training for all affected employees.
- Ensuring compliance with this safety policy and procedure through TEI's auditing process.

Supervisors:

- Ensuring that employees are instructed on good housekeeping practices when performing their job duties.
- Ensuring that combustible scrap and debris is being removed and properly disposed of, at regular intervals during the course of construction.

Employees:

- Following good housekeeping practices in the performance of their job duties.
- Reporting any hazardous conditions to their immediate supervisor.



Thompson Electric, Inc.

Welding, Cutting, Hot Work

Hot Work Permits & Fire Watches

2022

Policy

It is the policy of Thompson Electric to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public. Therefore, welding operations will be performed only by authorized and trained employees.

- When welding hazards exist that cannot be eliminated, then engineering practices, administrative practices, safe work practices, Personal Protective Equipment (PPE), and proper training regarding welding will be implemented. These measures will be implemented to minimize those hazards to ensure the safety of employees and the public.

This safety policy and procedure shall apply to all employees responsible for planning, supervising, and conducting welding and cutting operations including sub-contractor employees.

Thompson Electric has established that Hot Work ***is not*** permitted when the following conditions exist:

- In facilities where the entire sprinkler system is impaired;
- When a structures fire detection system is shut down;
- In the presence of explosive atmospheres, where mixtures of flammable gases, vapors, liquids or dusts may exist;
- In tanks, drums, or other containers and equipment that contain or previously contained materials that could create explosive atmospheres.

This safety policy and procedure is established in accordance with Occupational Safety and Health Standards for General Industry (29 CFR 1910.251-.257 and Occupational Safety and Health Standards for Construction Industry (29 CFR 1926.350-.354).

It is the responsibility of each Superintendent, Foreman and Employee to ensure implementation of Thompson Electric's safety policy and procedure on Welding and Torch Cutting Operations. It is also the responsibility of each Thompson Electric employee to report immediately any unsafe act or condition to the Superintendent or his/her immediate Supervisor.



Program Administration

The Vice President is responsible for the development, implementation, and overall administration of the welding and torch cutting operations. These responsibilities include, but are not limited to:

- The Welding and Cutting Procedure will be reviewed annually to ensure compliance with regulatory mandates and improve, as necessary, the guidance included in the procedure. Employee understanding of and compliance with, this procedure will be evaluated at least annually.
- Designate an individual, or individuals, responsible for authorizing welding and cutting operations.
- Advise sub-contractors about flammable materials or hazardous conditions of which the sub-contractors may not be aware, and select cutting/welding contractors with appropriately trained personnel who understand the risks involved.
- Ensuring that only NIOSH approved respiratory protection equipment and related supplies are purchased and utilized by Thompson Electric employees and/or sub-contractors employees.
- Ensuring compliance through the auditing process as outlined in Thompson Electric's Disciplinary Program.
- The Vice President may delegate the responsibility of various aspects of the Welding and Torch Cutting Operations Program to a Qualified Organization (as approved by the Vice President). However, the Vice President's ultimate responsibility for his/her aspects of the program cannot be delegated.

Field Superintendent shall:

- Provide guidance to employees and Foremen in the implementation of this procedure.
- Ensure all work areas and equipment used for welding/cutting operations is being inspected for compliance with the requirements of this procedure.
- Ensuring that a responsible Supervisor or Authorized Employee is in the immediate area of work on the Thompson Electric controlled jobsite during all hot work operations
- Ensures a site specific work safety and health plan is submitted by any and all subcontractors for Hot Work operations.
- Employee Training - Obtaining and coordinating welding and torch cutting operations training programs for all Affected Employees.
- Ensures that all requirements of Thompson Electric's Respiratory Protection Program are being met and adhered to by all Affected Employees.
- Monitors implementation and assesses overall effectiveness of the Welding and Torch Cutting Operations program, including specifically the Hot Work Permit and Fire Watch processes.
- Retains a copy of every completed Hot Work Permit at the corporate office for a period of at least three (3) years.
- With the approval of the Vice President the Field Superintendent may delegate the responsibility of various aspects of the Hot Work program to another Competent Person, or qualified organization (as approved by the Vice President). However the Field Superintendent's ultimate responsibility for his/her aspects of the program cannot be delegated.



Supervisory Personnel (i.e., Foremen) are responsible for:

- Overseeing the Hot Work Permit program for hot work operations under their supervision. Supervisory Personnel are responsible for fulfilling the duties of a **Permit Authorizing Individual (herein referred to as a PAI)**, who will issue Hot Work Permits.
 - Employees who have successfully completed hot work safety training may be a PAI. Hot work operators are allowed to act as a PAI, but they are not allowed to issue their own permits.
- Ensuring that all welding equipment, including cables, lines and any accessories, are in good working condition. If any indication of damaged equipment is present (i.e., broken/cut insulation on cables), tagging and immediately removing the equipment from service and repaired.
- Supervisors will not allow any employee who has not received the required training to perform any Hot Work activity.
- Ensure that respirators are properly worn and maintained as outlined in Thompson Electric's Respiratory Protection Program when required.
- With the approval of the Superintendent a Supervisor may delegate the responsibility of various aspects of the Welding and Torch Cutting Operations program to another qualified person, competent person or qualified organization. However, the Supervisor's ultimate responsibility for his/her aspects of the program cannot be delegated.

Permit Authorizing Individual (herein referred to as PAI) is responsible for:

- Identifying and notifying the Supervisor of tasks/procedures which may require a Hot Work Permit.
- Inspects Hot Work sites prior to the start of Hot Work Operations using the checklist found on the Hot Work Permit form.
- When a Fire Watch is required, the PAI will designate a trained employee to serve as Fire Watch and confirm their training.
- Once all requirements on the Hot Work Permit have been satisfied the PAI shall sign the Hot Work Permit and post in the area where the hot work is to be performed.
- **Revoking the permit** under the following conditions:
 - When circumstances would make the continued use of the source of ignition hazardous.
 - Any time the conditions of its issuance change.
 - Inactivity of permitted hot work in excess of two hours unless test(s) determine the LEL is less than 4% (or the host employer's requirements, whichever is stricter).
- Collecting and reviewing with the participants all completed Hot Work Permits which shall then be given to the Site Supervisor and/or Superintendent.

Employees Conducting Hot Work

- Shall be familiar with the site and procedures for sounding a local alarm and notifying the proper authorities in the event of a fire. A phone shall be available at the work site.
- Shall be trained in the use of fire extinguishers (as outlined in Thompson Electric's Fire Protection program).
- Conduct hot work operations in a safe and controlled manner, including all identified conditions and restrictions listed on the Hot Work Permit.
- Continue to perform hot work only so long as conditions are unchanged from those under which the Permit was granted.



Employees Conducting “Fire Watch” shall

- Have fire extinguishing equipment readily available and be trained in its use. They shall be familiar with facilities for sounding an alarm in the event of a fire. They shall watch for fires in all exposed areas, try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm.
 - All Fire Watches shall be trained in the use of the assigned fire extinguishing equipment upon initial employment and at a minimum annually.
- Maintain their post for at least a half hour after completion of hot work activity to detect, extinguish, and report ignition sources, fires, and potential ignition sources.
- Watch for fires in the exposed and hidden areas near to the hot work activity. Use proper fire extinguisher equipment to deal with small incipient fire incidents but be ready to sound the fire alarm immediately if a fire does not appear to be quickly extinguishable with hand extinguisher.
- Immediately notifying the PAI of the need to revoke the permit under the following conditions:
 - When circumstances would make the continued use of the source of ignition hazardous.
 - Any time the conditions of its issuance change.
 - Inactivity of permitted hot work in excess of two hours unless test(s) determine the LEL is less than 10%
- When applicable assure emergency personnel are advised of the Hot Work and its exact location.

Employees

- Shall comply with all applicable guidelines contained in this safety policy and procedure.
- Employees directly involved in welding and torch cutting operations are responsible for ensuring that all fire prevention and fire protection measures have been taken before any torch cutting or welding begins.
- Report any problems or malfunction with welding or torch cutting equipment to the Supervisor immediately.
- Ensuring that all PPE’s worn properly for the specific hazard involved and that all equipment is in good working condition, cleaned and stored properly when not in use.
- Each employee is responsible for bringing hazards to the attention of his or her immediate supervisor for correction as soon as the hazard is recognized.

The Designated Human Resources representative is responsible for:

- The designated human resources representative will prepare and maintain an Employee Education and Training Record upon completion of training and any retraining. These documents will include, but not be limited to;
 - Names or other identities of employees trained;
 - Signature of the person receiving the training;
 - Date of the training;
 - Date of retraining;
 - Specific topics addressed during the training session;
 - Specific topic(s) addressed during the retraining session;
 - Signature of the person, or company, conducting the training;
 - Signature of the person, or company, conducting the retraining.
- All training and re-training shall be documented.



When Applicable the Host Employer shall:

- Inform Thompson Electric of areas authorized for welding and cutting operations.
- Inform Thompson Electric of specific areas and/or equipment where welding and cutting are not authorized.
- Inform Thompson Electric of any precautions or procedures the host has implemented for employees in or near our work areas.
- Coordinate welding and cutting actions with Thompson Electric when both the host employees and our employees will be working on or near the same equipment, machinery, or systems.
- Debrief the involved employees at the conclusion of welding and cutting operations to determine any hazards confronted or created in the work area or may still arise as a result of the hot work activity.



Welding & Cutting Procedures

General Information

- Supervisors and workers performing welding, cutting, and/or brazing operations shall be trained in hazard recognition, evaluation, and control; fire protection; and safe work practices; and shall adhere to requirements in this procedure.
- **Welding/Cutting Areas:** Whenever possible, welding and/or cutting operations should be performed in areas that are isolated and designated for such uses. Welding or cutting must not be performed in the following areas:
 - In the presence of explosive atmospheres;
 - In areas near the storage of quantities of exposed, ignitable materials;
 - In sprinklered buildings while such protection is impaired; or,
 - In areas not authorized by management, the host employer, or by a hot work permit.
- Whenever welding operations are interrupted for a substantial period of time (i.e., lunch or overnight) or completed, "hot" metal areas must be identified, and the equipment must be shut off with any valves closed.
- **Equipment:** Personnel are required to use approved welding, cutting, and grinding equipment and follow the manufacturer's instructions. Such equipment shall be maintained in safe working order at all times. Personnel shall report any equipment defect or safety hazard to a supervisor, and the use of such equipment must be discontinued until it is repaired by qualified personnel.
- **Site Preparation:** Prior to beginning welding or cutting operations, workers must:
 - Check the work area (35' radius) to ensure that no fire hazards including oily or greasy materials are present;
 - Move the object to be welded or cut. If the object cannot readily be moved, all moveable fire hazards shall be removed (see below for additional guidelines).
 - Remove all combustible materials within 35' not necessary for the operation. Any combustible material that cannot be removed, such as wood platforms, then guards shall be used to confine the heat, sparks, and slag.
 - The present fire hazards shall be covered with a flame-resistant material and a fire watch utilized;
 - Check that all equipment is in good working condition;
 - Inform workers in the immediate area and display warning signs at the worksite to alert others of the potential hazards;
 - Install welding shields/curtains to protect other workers from the sparks and intense light associated with welding/cutting operations; and
 - When performing welding, cutting, and/or brazing operations in areas on or around Acutely Hazardous Materials which are included in a Process Safety Management (PSM) Program, a hot work permit is required.
 - If at any time it is deemed the hot work activity (i.e., welding, cutting, brazing) cannot be performed safely then the work shall not be performed until such time that it can and a PAI consents.
- **Ventilation:** Cutting or welding operations must be performed in areas with adequate ventilation to keep fumes and gases within safe limits.
 - Local exhaust ventilation must be used when potentially hazardous materials are being worked on. (Examples of potentially hazardous materials include, but are not limited to, chromium, fluorides, zinc, beryllium, cadmium, lead, and mercury).



- Adequate exhaust ventilation must be used when using inert-gas welding, plasma-arc cutting or carbon-arc cutting.
- The metal surface shall be free of all chlorinated solvents during any welding or cutting operations.

- **Personal Protective Equipment:** Approved personal protective equipment (PPE) shall be worn by all employees performing or assisting in welding and/or cutting operations.
 - Examples of PPE include eye protection, helmets and hand shields, flame resistant gloves, limb/body protection, and respiratory protection.
 - While performing overhead or vertical welding, personnel must wear leather personal protective equipment (shoulder, head, and ear covers).
 - All welders should wear flame-resistant aprons, coveralls, gauntlet gloves and shirts with sleeves of sufficient length and construction to protect the arms from heat, UV radiation, and sparks.
 - Wool and leather clothing are preferred because they are more resistant to deterioration and flame than cotton or synthetics. Synthetic fiber clothing should not be worn unless it is specifically manufactured to be fire retardant.
 - Clothing should be kept reasonably free of oil or grease.
 - Front pockets and upturned sleeves or cuffs should be prohibited. Sleeves and collars should be kept buttoned and high boots should be worn under pant legs (or leggings worn) to prevent hot metal slag or sparks from contacting the shin.
 - Personnel must wear respiratory protection when ventilation is not sufficient to prevent exposure above permissible limits. (When performing cutting or welding operations involving coatings which generate toxic substances upon heating, or working with materials that contain beryllium, cadmium, lead, or mercury, personnel must wear respiratory protection).
 - Workers welding on metal alloys should wear work uniforms, coveralls, or similar full-body coverings that are laundered each day. Lockers or other closed areas should be provided to store work and street clothing separately.
 - Other personnel in welding/cutting areas not protected by noncombustible or flameproof screens or shields must wear appropriate goggles.
- **Confined Space Operations:** Proper precautions must be taken by personnel who are required to perform welding or cutting operations in a confined space area. Refer to the Confined Space Pre-Entry Procedure, and contact the Entry Supervisor prior to performing welding or cutting operations in a confined space.
 - No work is to commence until all requirements of the Confined Space Entry Safety Policy and Procedures are met and a Hot Work Permit is submitted to the PAI for review and approval.
 - Mechanical ventilation will be provided during any confined space hot work operation to prevent the accumulation of toxic materials or possible oxygen enrichment or deficiency. All heavy and portable equipment used in confined space welding or torch cutting operations will be secured before operations begin.
 - When a welder must enter a confined space through a manhole or other small opening, the welder will be attached to a manned lifeline. The lifeline will be attached to not interfere with the welding operation or with the removal of the welder in case of an emergency. A preplanned (and practiced) emergency rescue procedure will be in place prior to the welding operation.
 - When arc welding operations are completed or temporarily stopped, all electrodes will be removed from the holders. The holders are to be carefully positioned and stored so that accidental contact cannot occur.



- **Prior to performing hot work or welding tanks, cylinders, or other containers**, supervisory personnel must contact the PAI to complete a hot work permit and shall verify that such containers do not contain, or have not contained, any flammable, toxic, or explosive materials. If containers have contained flammable, toxic, or explosive materials, they must be emptied, flushed, or otherwise purged and sampled prior to welding.
- **Fire Protection:** Fire protection equipment must be maintained ready for use at all times that welding or cutting operations are being performed.
 - Utility trucks supporting welding/cutting operations must be equipped with fire fighting and fire protection equipment, including a fire extinguisher of at least 10 A:B:C rating.
 - If welding is to be performed in areas where a fire hazard may exist, fire watch practices must be established and implemented. (See Hot Work Permit.)
 - When performing welding or cutting operations on coated surfaces that are highly flammable (determined by a flammability test), the coating must be stripped from the area to prevent ignition.
- All surfaces covered with toxic preservatives, including coatings which generate toxic substances upon heating, must be stripped for a distance of at least 4 inches from the area of heat application.
- Sub-contractors performing welding and cutting operations must be made aware of the risks involved in the operations, and shall obtain approval from the Superintendent in addition to the PAI prior to performing such operations.

Fire Suppression & Protection

- Suitable fire protection equipment must be maintained ready for use at all times that welding or cutting operations are being performed. If welding is to be performed in non-approved areas, supervisory personnel must complete a hot work permit.
- A Fire watch and a hot work permit are required when welding or cutting is performed where:
 - Combustibles are closer than 35' to the point of operation, or where there are appreciable combustibles easily ignited by sparks;
 - Wall, floor, or other openings within 35' radius that expose combustible materials; or
 - Combustible materials are adjacent to the opposite side of metal walls, partitions, ceilings, or roofs and are likely to be ignited by conduction or radiation.
- If required, **duties of the Fire Watch** include:
 - Using fire extinguishing equipment to extinguish fires within the capacity of equipment available;
 - Sounding an alarm in the event of a fire;
 - Watching for fires in all exposed areas;
 - Maintaining a fire watch for at least 1/2 hour (30 minutes) after completion of welding or cutting operations; and
 - Reporting any injury, including suspected flash burns, to their supervisor.



Hot Work Permit

- Prior to performing welding/cutting operations in the following circumstances, a hot work permit must be completed and approved by the PAI and appropriate supervisor.
 - In locations that have not been designated as approved welding locations.
 - In confined spaces.
 - Welding or cutting tanks, cylinders, or other containers.
 - In areas where a fire hazard may exist (example: weeds, wood products, fabrics, etc).
 - In areas included in the Process Safety Management Program for Host Employers (if applicable).
 - In areas where combustibles are closer than 35' to the point of operation.
 - In areas where combustible materials are adjacent to the opposite side of metal walls, partitions, ceilings, or roofs and areas likely to be ignited by conduction or radiation.
- Copies of open permits must be maintained at the job site and in the supervisor's office. Upon job completion, closed permits should be maintained for three (3) years.

Oxy-Fuel Welding & Cutting

- Prior to beginning welding or cutting operations, workers must check that the cylinders, regulators, backflow prevention device, flame arrestors, hoses, clamps, and torches are in good working condition.
- Oil or grease must not come into contact with oxygen cylinders, valves, regulators or other fittings. Do not handle oxygen cylinders or apparatus with oily hands or gloves, or greasy materials. Do not let oxygen contact oily or greasy surfaces or clothes, or enter a fuel oil or other storage tank.
- Fuel gas and oxidizers must pass through a pressure-reducing regulator prior to being used. Pressure reducing regulators must only be used at or below the rated pressures and must be specific to the type of gas being used. Prior to connecting a pressure regulator, cylinder valves should be "cracked" to clear the dust or dirt that might otherwise enter the regulator. This procedure shall be performed away from other welding work or sparks.
- Prior to removing a regulator from a cylinder, personnel must close all cylinder valves, and release the gas from the regulator.
- Personnel must follow the manufacturer's operating procedures for lighting the torch. Generally accepted practices for start up and shut down follow:
 1. **Start Up**
 - Open the oxygen valve on the torch handle and adjust the oxygen regulator to the desired delivery range.
 - Close the torch handle oxygen valve.
 - Open the fuel valve on the torch handle and adjust the fuel regulator to the required delivery range.
 - Close the torch fuel control valve.
 - Hold the torch in one hand and the spark lighter in the other. Open the torch fuel valve approximately one-half turn and ignite the gas.
 - Point the torch away from people and combustible materials.
 - Keep opening the fuel valve until the flame stops smoking and bring the flame back to the tip.
 - Open the torch oxygen valve until a bright neutral flame is reached.



2. Shut Down

- When shutting down the system, first shut off the oxygen, then the fuel gas. Drain the gas pressures from the system.
- Cylinders must be kept far enough away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them, or fire-resistant shields must be provided.

Care of Compressed Gas Cylinders

- Compressed gas cylinders shall be legibly marked identifying the contents.
- Compressed gas cylinders shall be stored and transported in the following manner:
 - Valve end must be up.
 - Outside storage areas must be protected from direct sunlight, external heat sources, electric arcs, or high temperatures.
 - Inside storage areas must be well-protected, well-ventilated, and in a dry location at least 20 feet from highly combustible materials.
 - Cylinders containing flammable gases will be stored at least 20 feet from oxygen cylinders.
 - Cylinders shall not be kept in unventilated enclosures such as lockers and cupboards, or inside the cabs or passenger areas of vehicles.
 - Valve protection devices must be in place when cylinders are not in use, and during storage and transport. Valve protection devices **must not** be used for lifting cylinders.
 - Cylinders must be prevented from tipping, falling, or rolling.
 - All empty cylinders will be handled and stored as if they were still pressurized.
- If cylinders are found to have leaky valves or fittings which cannot be stopped by closing the valve, the cylinders shall be taken outdoors, away from sources of ignition, and slowly emptied. Never put other workers at risk. If the leak is large, do not attempt to move the cylinder, evacuate all personnel from the area and notify your supervisor.
- Pressurized cylinders must not be taken into confined spaces.

Electric Arc Welding & Cutting

- Prior to beginning welding or cutting operations, workers must:
 - Check that the machine, all electrode holders and cable are capable of carrying the maximum current, are properly insulated and grounded, and have been maintained in good working condition.
 - Check that any cable splices have been performed with insulating quality equal to that of the cable, and that there are no splices within 10 feet of the electrode.
 - The area must be free of chlorinated solvent vapors within 50 feet of the exposed arc; surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is performed on them.
- When arc welding is performed in wet or high humidity conditions, personnel must use additional protection against electric shock (e.g., rubber pads or boots).
- To protect workers or other personnel from the arc rays, noncombustible or flameproof screens or shields shall be used, or personnel in the area shall wear appropriate goggles.
- Manual electrode holders must be specific to welding and cutting, and capable of handling the maximum current required for the operation. All current carrying parts gripped by the user must be insulated against the maximum voltage to ground.



- Arc welding and cutting cables must be insulated, flexible, capable of handling the maximum current required by the operation, taking into account the duty cycles, and must not have bare or worn conductors. Cables must be free of repair or splice from 10' of the electrode holder unless insulated connectors or splices with insulating quality equal to that of the cable are provided. Exposed metal parts must be insulated.
- Ground return cables must have current carrying capacity equal to or exceeding the total maximum output capacities of the welding or cutting unit. Do not use electrical conduits or structures or pipelines containing gas or flammable liquids as part of the grounding circuit system.
- Arc welding and cutting machine frames must be grounded, either through a third wire in the cable containing the circuit conductor or through a separate wire at the source of the current. Grounding circuit resistance must be low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.
- When machines are not in use, the power supply switch shall be shut off and the electrodes removed and the holders placed to prevent employee injury.

Inert Gas Metal Arc Welding

- When performing inert-gas metal-arc welding, extreme caution shall be used; inert gases can easily displace oxygen. The following safeguards must be followed:
 - The area must be free of chlorinated solvent vapors within 50 feet of exposed arc; surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is performed on them.
 - Employees exposed to radiation must have their skin completely covered.
 - If welding on stainless steel, personnel must be protected by local exhaust ventilation or by wearing supplied-air respirators.

Resistance Welding

- Prior to performing resistance welding operations, personnel must inspect the machine to ensure:
 - All machine guards are in position and in proper working condition; and
 - Emergency stop button(s) are in working condition.
- Resistance welding equipment must be periodically inspected by qualified personnel, and a certification record maintained. The record shall include the date of the inspection, the signature of the person who performed the inspection, and the serial number or other equipment identification.

Ventilation Guidelines for Welding Operations

- Mechanical ventilation will be provided for welders and helpers when:
 - Welding is being performed in a space less than 10,000 cubic feet per welder.
 - A room has a ceiling height less than 16 feet.
 - A confined space or welding space contains partitions, balconies, or other structural barriers to the extent that obstruct cross ventilation.
- The minimum rate for mechanical ventilation will be 2,000 cubic feet per minute per welder unless exhaust hoods or air-supplied respirators are provided.



- When using local exhaust hoods, they will be placed as close to the operation as possible.
 - The exhaust hood will provide a rate of 100 linear feet per minute of air flow in the welding zone.
- Air-supplied respirators will be used when mechanical ventilating is not possible or when materials such as beryllium and cadmium are used.
 - Refer to Thompson Electric's Respiratory Protection Program and/or Thompson Electric's Cadmium Program for additional details.
- Local exhaust ventilation or supplied respirators will be used when welding or torch cutting on coated metals (i.e., zinc, mercury, cadmium, lead, etc.) indoors or in confined spaces.
 - Outdoor operations shall be done using respiratory protective equipment.





Hot Work Permit

page one of two

Work Being
Performed by:

☐ Thompson Electric

☐ Sub-Contractor

Name/Title of Thompson Responsible Party	Host Employer Responsible Party (if applicable)
Phone Number	Host Employer Responsible Party Phone Number
Name of Welder(s)	Name of Qualified Fire Watch
Job Location	Description of Work

Describe possible sources of ignition (i.e., acetylene torch, soldering, electric, arc, etc.)

Type of gases and other materials being used

Yes	No	N/A	Fire Safety
			Are there fire alarm devices in the area that could be impacted by work fumes or smoke? If YES , you must notify the host employer for additional instructions prior to proceeding. Directions from host employer shall be recorded on the back of this permit and signed by the host employer representative.
			Is the appropriate type (i.e., Dry Chemical) fire extinguisher located in work area?
			Is there methods to control heat, sparks, or slag from traveling to other areas? (i.e., opposite side of wall, inside ducts or pipes being worked on, etc.)
			Are combustible/flammables within 35 feet of work (including floors, walls and areas adjacent to the walls being work on) removed or protected with appropriate fire resistant tarpaulin or shields? (i.e., fire resistant blanket tight to the floor and secured)
			Has the following been reviewed with the Qualified Fire Watch? If NO review at this time.
			- Location of appropriate fire-fighting equipment - How to correct or stop any conditions which may lead to fire - How to notify the appropriate personnel and sound the alarm in the event of an emergency - How to use a fire extinguisher (verify fire watches training) - How to monitor the work on both sides of a wall/floor if applicable - How to monitor the worksite for smoldering fires for at least 30 minutes following job completion
Yes	No	N/A	Confined Space Entry Work
			Is the space large enough that a person can bodily enter, has limited means of entry/exit, and space is not designated for continuous human occupancy? If YES , notify the General Superintendent for permission and instructions on how and when to proceed. The Confined Space policy and its required permits must be consulted and complied with prior to commencement of any work activity (i.e., confined space permit, attendant).
Yes	No	N/A	General Safety
			Is mechanical ventilation needed to keep toxic gases, vapors, fumes or dusts below the maximum allowable concentrations?
			Is Lockout/Tagout required? If YES, follow Lockout/Tagout procedures.
			Are pipelines or connections disconnected or blanked?
			Have all welding and cutting equipment been inspected to ensure it is in good working conditions?
			Do ALL exposed workers have appropriate personal protective equipment? (i.e., gloves, eye & hearing protection, respiratory, special clothing, boots, etc.)



Hot Work Permit

page 2 of 2

Work Being
Performed by:

- ☐ Thompson Electric
☐ Sub-Contractor

Additional Instructions for Fire Alarm Devices including those of the Host Employer. All involved parties are to initial this section to confirm review and compliance. If this section is not reviewed and confirmed by all involved parties the described hot work shall not commence.

Any special conditions and/or safety precautions (i.e., explain). All involved parties are to initial this section to confirm review and compliance. If this section is not reviewed and confirmed by all involved parties the described hot work shall not commence.

Signatures Required Before Beginning Work

All hot work shall be performed by personnel who are trained in the safe operation of equipment and are trained and familiar with Thompson Electric's Hot Work policy. The Supervisor authorizing the hot work as described in this permit must inspect the work area before issuance of a Hot Work Permit.

- This permit expires at the end of the job or if conditions change that adversely affects safety in the work area.
- Return permit to the General Superintendent upon expiration.

I have been instructed and I have read and understand the hazards as well as the precautions necessary to do this work safely

Signature of Person Performing Hot Work

Date/Time

Signature of Person Performing Hot Work

Date/Time

I verify the work site has been inspected, that all necessary precautions have been taken to prevent fires and/or explosions to control hazardous conditions, and the individual(s) signed above is authorized to begin doing this work.

Signature of Supervisor Authorizing Hot Work

Date/Time

Signature of Fire Watch

Date/Time

Signatures Required Upon Completion of Work

I have personally inspected the work site after completion of the work and find the area to be in a safe condition.

Signature of Supervisor Authorizing Hot Work

Date/Time

Signature of Fire Watch

Date/Time