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# PURPOSE

To establish the minimum requirements necessary to protect personnel from hazards created from machinery or equipment at TI sites worldwide. Examples include: moving parts; nip and pinch points; rotating or reciprocating parts; flying chips; sparks or projectiles created by moving equipment, and; systems with extreme temperatures.

# SCOPE

The provisions of this standard apply to all TI employees, suppliers, vendors, and visitors at TI sites worldwide.

# reference documents

## TI ESH Standard [04.01, "Electrical Safety"](https://sps01.itg.ti.com/sites/wwf/esh/standards/_layouts/WordViewer.aspx?id=/sites/wwf/esh/standards/Knowledge_Bank/04.01.docx&Source=https%3A%2F%2Fsps01%2Eitg%2Eti%2Ecom%2Fsites%2Fwwf%2Fesh%2Fstandards%2FKnowledge%5FBank%2FForms%2FAllItems%2Easpx&DefaultItemOpen=1&DefaultItemOpen=1)

## TI ESH Specification [04.01A, “Electrical Lab Safety”](https://sps01.itg.ti.com/sites/wwf/esh/standards/_layouts/WordViewer.aspx?id=/sites/wwf/esh/standards/Knowledge_Bank/04.01A.docx&Source=https%3A%2F%2Fsps01%2Eitg%2Eti%2Ecom%2Fsites%2Fwwf%2Fesh%2Fstandards%2FKnowledge%5FBank%2FForms%2FAllItems%2Easpx&DefaultItemOpen=1&DefaultItemOpen=1)

## TI ESH Specification [06.11, “Lock Out Tag Out”](https://sps01.itg.ti.com/sites/wwf/esh/standards/_layouts/WordViewer.aspx?id=/sites/wwf/esh/standards/Knowledge_Bank/06.11.docx&Source=https%3A%2F%2Fsps01%2Eitg%2Eti%2Ecom%2Fsites%2Fwwf%2Fesh%2Fstandards%2FKnowledge%5FBank%2FForms%2FAllItems%2Easpx&DefaultItemOpen=1&DefaultItemOpen=1)

## [U.S. Occupational Safety and Health Administration Regulations 29 Code of Federal Regulations, 1910 Subpart O “Machinery and Machine Guarding”](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10112&p_text_version=FALSE)

## [U.S. Occupational Safety and Health Administration Regulations 29 Code of Federal Regulations, 1910.147 “Control of Hazardous Energy”](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10112&p_text_version=FALSE)

## American National Standard Institute (ANSI)

## National Fire Protection Association "National Electrical Code"

# Definitions

[TI ESH Standards Glossary of Definitions](https://sps01.itg.ti.com/sites/wwf/esh/standards/default.aspx)

# Requirements

## Sites shall identify and eliminate or control potential hazards to personnel that are created by the setup, operation, maintenance and repair of equipment or systems that have moving parts or extreme temperatures. At a minimum, the following provisions shall apply.

## Provisions for risk assessments

#### Competent persons shall ensure that a hazard analysis is performed that includes:

##### A review of the potential hazards to operators, maintenance, and passerby personnel,

##### A review of the hazards associated with moving parts and extreme temperatures that are likely to be encountered during the normal operation of the equipment,

##### A review of the hazards from uncontrolled energy releases. Proper lock-out tagout provisions in accordance with TI ESH Standard 06.11 “Control of Hazardous Energy (Lockout/Tagout)” shall be utilized if uncontrolled energy release is possible during service or maintenance activities, and

Note: Devices such as push buttons, selector switches and interlocks are not considered energy isolation devices.

##### A review of any safeguards needed or provided on the equipment.

##### Note: Redundant safeguards may be considered to ensure protection.

## Provisions for safeguarding equipment or systems

#### Sites shall ensure that safeguards are installed which prevent the unintentional entry of any part of a person’s body into the point of operation or other danger zone of equipment or systems while they are operating. Examples of safeguarding methods include but are not limited to:

##### Tape switch mats - installed on the floor in locations where personnel may enter into the path of moving equipment or systems,

##### Barrier guards - designed and constructed to prevent any part of the body from making contact with the moving parts of the equipment or system,

### Note: While push sticks or other hand-held devices used to insert, position, unjam or remove material during machine operation may be considered safety measures, they are not considered machine safeguards.

##### Two-hand activating devices - designed to require pressure on both control buttons at the same time to activate the machine cycle. When hands are removed from one or both controls, the equipment or system deactivates,

##### Electronic safety devices (i.e., photo-cell light beams (light curtains), interlocks, etc.), and

Note: Safeguards interlocked with equipment or systems shall be designed, installed and maintained to fail in the safe mode, so that the failure of the safeguard does not prevent the machine or equipment from being stopped or deactivated safely.

Note: Activation of an interlock, light curtain, etc., should require manual reset rather than automatic reset.

##### Guard rails - designed to be substantial enough to support the weight of any person that may be imposed on them.

## Provisions for operating and maintenance instructions

#### Sites shall ensure operating and maintenance instructions are developed and reviewed with all appropriate employees, prior to them operating or working on the equipment or system. These instructions shall include instructions about the use of any safeguarding devices provided on the equipment.

## Provision for maintenance

#### Sites shall implement preventive maintenance programs on equipment to ensure the continued functionality and working condition of their safeguarding devices and systems.  When problems with equipment safeguarding devices cannot be immediately repaired, temporary alternate means of personnel protection shall be implemented, or the equipment shall be removed from service.

## Provisions for temporarily defeating interlocks

#### Prior to allowing temporarily defeated of interlocks, while service or maintenance activities are occurring, sites shall review the interlock to ensure it meets the minimum requirements for conduct and document the assessment using Appendix A. Once the service or maintenance has been completed the site shall have a process to ensure the interlocks are placed back into the proper operating state prior to releasing the tool back to a production state.

#### Note: The temporary defeating of an interlock assessment is required initially and if there is a change in the procedure or tool that would affect the initial assessment.

## Permanent bypassing of interlocks

#### Prior to allowing any permanent bypassing or modification of interlocks, sites shall evaluate the need for modification or permanent bypass and the site shall complete Appendix A (Interlock Assessment form) and submit to Worldwide ESH (WWESH) for approval.

#### Note: WWESH has identified a team ([email](mailto:equipment_perm_mod@list.ti.com)) to evaluate the proposed change. The evaluation team will include at a minimum the following disciplines from WWESH: Equipment Safety; Safety; Industrial Hygiene, and; Environmental (if needed). Any additional members can be added based on need and the review process may require a third party reevaluation.

## Provisions for training

#### Sites shall ensure individuals who install, set-up, operate, use, or service equipment are trained in the safe operation of that equipment or system including the function and use of each safeguard. Employees shall be re-trained if the risk-assessment information changes, or if the equipment safeguarding is modified.

# STANDARD Approval

This standard has been approved by Zane Broadhead, TI Vice President.

# Revision history

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Rev** | **Date** | **Nature of Revision** | **Author/Editor** | **Approver** |
| A | 10/30/13 | * Initial Standard Update | R. Graves | ELC |
| B | 09/04/19 | Changed title from Mechanical Guarding to Machine Guarding  Updated format and Standard Approval block  - Updated the standard to include provisions for temporary and permanent defeating of interlocks.  - Added link for Appendix A (separate document on Standards Page) | R. Graves | ELC |
|  |  |  |  |  |

[Appendix A](https://sps01.itg.ti.com/sites/wwf/esh/standards/_layouts/xlviewer.aspx?id=/sites/wwf/esh/standards/Knowledge_Bank/06.08_AppxA.xlsx&Source=https%3A%2F%2Fsps01%2Eitg%2Eti%2Ecom%2Fsites%2Fwwf%2Fesh%2Fstandards%2FKnowledge%5FBank%2FForms%2FAllItems%2Easpx&DefaultItemOpen=1&DefaultItemOpen=1)

[Interlock](https://sps01.itg.ti.com/sites/wwf/esh/standards/_layouts/xlviewer.aspx?id=/sites/wwf/esh/standards/Knowledge_Bank/06.08_AppxA.xlsx&Source=https%3A%2F%2Fsps01%2Eitg%2Eti%2Ecom%2Fsites%2Fwwf%2Fesh%2Fstandards%2FKnowledge%5FBank%2FForms%2FAllItems%2Easpx&DefaultItemOpen=1&DefaultItemOpen=1) Assessment Template