

SEMI S20-0303 (Withdrawn 1108)

SAFETY GUIDELINE FOR IDENTIFICATION AND DOCUMENTATION OF ENERGY ISOLATION DEVICES FOR HAZARDOUS ENERGY CONTROL

This standard was technically approved by the global Environmental, Health, and Safety Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on August 29, 2008. It was available at www.semi.org in October 2008 and on CD-ROM in November 2008. Originally published March 2003.

NOTICE: This document was balloted and approved for withdrawal in 2008.

NOTICE: Paragraphs entitled “NOTE” are not an official part of this document and are not intended to modify or supersede the official guideline. The task force has supplied them to clarify and to enhance usage of the guideline by equipment designers.

NOTICE: The intent of the task force that produced this document is that conformance to the “should” provisions of this guideline comprises conformance with this guideline.

1 Purpose

1.1 This guideline is intended to establish a method for the unique identification of Energy Isolation Devices (EID) used for lockout/tagout (LOTO). This identification is intended to occur both at the devices and at those places in the supplier-provided manuals where the devices are referenced in tasks or procedures.

NOTE 1: Throughout this document, “LOTO EID” refers to these devices.

1.2 This document supplements the existing provisions in SEMI S2 (for Hazardous Energy Isolation) and SEMI S13 (for providing appropriate documentation) with a uniform graphical representation and identification system.

1.3 This document also provides guidance for developing instructions for operating LOTO EIDs.

2 Scope

2.1 This guideline applies to equipment used to manufacture, measure, assemble, and test semiconductor products, and the maintenance and service procedures associated with the equipment.

2.2 This guideline provides criteria for documentation and identification of all supplier-specified LOTO EIDs meeting the criteria of SEMI S2. This includes isolation devices that the supplier intends to be provided by the end user.

EXCEPTION: Equipment in which a cord and plug connection is the only LOTO EID is exempt from this guideline.

NOTE 2: Isolation devices with locking capability are not necessarily LOTO EIDs, unless the supplier specifies them as LOTO EIDs.

NOTE 3: In some jurisdictions, it is the responsibility of the supplier to specify the energy isolation points that must be locked out in conjunction with the manufacturer-specified maintenance procedures. However, the end user is responsible for the overall hazardous energy control program for the work site and for the installation of additionally required facility EIDs. The user is not responsible for EIDs that are required by regulation to be incorporated within the equipment.

NOTICE: This safety guideline does not purport to address all of the safety issues associated with its use. It is the responsibility of the users of this safety guideline to establish appropriate safety and health practices and determine the applicability of regulatory or other limitations prior to use.

3 Limitations

3.1 This document is not intended to provide guidelines for developing or replacing user-site energy isolation programs.

3.2 This document is not intended to be used in place of the need for adequate training of individuals who perform hazardous energy control.

3.3 This document is not intended to conflict with laws and regulations on Control of Hazardous Energy.

3.4 This guideline does not contain criteria or requirements for providing a particular LOTO EID to be used in a LOTO program.

NOTE 4: The requirements and criteria for providing a particular LOTO EID for use in a LOTO program may be found explicitly or implicitly in SEMI S2, equipment design standards, United States OSHA requirements, or in various good engineering practices.

3.5 This document is not intended to replace or supersede SEMI S2 or any other SEMI Safety Guideline.

3.6 This document is not intended to be applied retroactively, i.e., to designs already in the field.

3.7 This document does not apply to the labeling of hazards, which is the function of SEMI S1.

4 Referenced Standards and Documents

4.1 SEMI Standards

SEMI S1 — Safety Guideline for Equipment Safety Labels

SEMI S2 — Environmental, Health, and Safety Guideline for Semiconductor Manufacturing Equipment

SEMI S8 — Safety Guidelines for Ergonomics Engineering of Semiconductor Manufacturing Equipment

SEMI S13 — Safety Guidelines for Operation and Maintenance Manuals Used With Semiconductor Manufacturing Equipment

4.2 ANSI Standard¹

ANSI Z535.1 — Color Coding for Labels

4.3 Code of Federal Regulations — United States of America²

29 CFR 1910.147 — The Control of Hazardous Energy (lockout/tagout)

29 CFR 1910.147 — Appendix A “Typical Minimal Lockout Procedure”

4.4 ISO Standard³

ISO 3864 — Safety Colours and Safety Signs

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

5 Terminology

5.1 Abbreviations and Acronyms

5.1.1 LOTO — acronym for lockout/tagout.

NOTE 5: Also equivalent to the term Hazardous Energy Isolation (HEI), which may be used in some jurisdictions.

5.2 Definitions

5.2.1 *blocking (v)* — preventing flow of material as through piping or preventing energies (such as suspended weights or springs) held in a suspended state from movement.

5.2.2 *clean room compatible materials* — materials approved for use within a fabrication facility, including: laminated card stock or paper, clean room paper, electronic media or other approved media.

5.2.3 *Energy Isolation Device (EID)* — a mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect

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2 United States Occupational Safety and Health Administration, Available from U.S. Department of Labor; <http://www.osha.gov>

3 International Organization for Standardization, ISO Central Secretariat, 1 rue de Varembe, Case postale 56, CH-1211 Geneva 20, Switzerland. Telephone: 41.22.749.01.11; Fax: 41.22.733.34.30; <http://www.iso.ch>

switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches, and other control devices are not energy isolation devices. [OSHA 29 CFR 1910.147]

NOTE 6: Lockout devices (elsewhere defined in this document) are not energy isolation devices.

5.2.4 *graphical* — using an image or multiple image representation that reflects the equipment as assembled and is used for indicating the location of the individual LOTO EIDs in relation to the equipment being maintained. Images include labeled drawings, or photographs enhanced with labels.

5.2.5 *graphical reference guide* — the merger of text instructions and graphical representations of the equipment in a manner that provides a clear description of the task and a simple means of locating the correct devices.

5.2.6 *lockout* — the placement of a lockout device on an energy isolation device, in accordance with an established procedure, ensuring that the energy isolation device and the equipment being controlled cannot be operated until the lockout device is removed. [OSHA 29 CFR 1910.147]

5.2.7 *lockout device* — a lock and associated hardware used to secure an EID in the safe position and prevent energy flow.

NOTE 7: Energy isolation devices (elsewhere defined in this document) are not lockout devices.

5.2.8 *maintenance* — planned or unplanned activities intended to keep equipment in good working order. (See also definition for *service*.) [SEMI S2]

5.2.9 *marked* — identified by the use of a label, engraving, silk screening, etching, or other physical and durable indication; placed near components or on systems for the purpose of matching to identifying documentation.

5.2.10 *service* — unplanned activities intended to return equipment that has failed to good working order. (See also the definition for *maintenance*.) [SEMI S2]

5.2.11 *tagout* — the placement of a tagging device (such as a tag and a secure means of attachment) to an energy isolation device in accordance with an established procedure. The tagout indicates that the energy-isolation device may not be operated until the tagging device is removed.

6 Task Specific Information

6.1 For each task requiring hazardous energy isolation (i.e., LOTO), the following information should be provided in a combined format (including labels, maintenance manuals, and graphical reference guides as described in §§ 7, 8, and 9 of this document).

NOTE 8: In some jurisdictions the bulleted items below are required.

6.1.1 Identification of:

- type and magnitude of hazardous energies to be isolated,
- LOTO EIDs necessary for controlling sources of hazardous energy, and
- lockout devices necessary to secure the LOTO EIDs.

6.1.2 Instructions for the following:

- isolating each source of energy,
- blocking energy, or reducing the potential to a zero energy state (such as blocking chemical lines or blocking the suspended energy state in a spring or raised weight),
- dissipating any residual energy,
- isolating hazardous energy sources that are isolated by disconnection, but for which there are no lockable EIDs. These instructions should state that the protection depends on the means of disconnection remaining in the immediate control of the personnel performing the work,
- attempting to restart the equipment or re-energize the system(s) that is/are to be isolated from hazardous energy, and
- verification that there is no hazardous residual energy in the system.