

SEMI S19-1102

SAFETY GUIDELINE FOR TRAINING OF SEMICONDUCTOR MANUFACTURING EQUIPMENT INSTALLATION, MAINTENANCE AND SERVICE PERSONNEL

This safety guideline was technically approved by the Global Environmental, Health, and Safety Committee and is the direct responsibility of the North American Environmental, Health, and Safety Committee. Current edition approved by the North American Regional Standards Committee on August 29, 2002. Initially available at www.semi.org September 2002; to be published November 2002.

1 Purpose

1.1 Provide guidance to the employer for environmental, health and safety proficiencies.

NOTE 1: The “employer” is determined by regulation or by contact.

1.2 Establish specific learning objectives which, when fulfilled, demonstrate a baseline level of Environmental, Health and Safety (EHS) proficiency.

1.3 Identify quality control, documentation and record keeping criteria for the management of EHS training programs.

2 Scope

2.1 This document applies to the EHS training of personnel servicing, maintaining, installing or otherwise providing semiconductor equipment support.

2.2 All elements of this guideline are necessary for declaring conformance to the guideline.

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 guideline is not intended to apply to trades used in the facility construction and remodeling, or provision of building or facility services to semiconductor equipment.

3.2 The guideline provided herein is not intended to represent an all inclusive or exhaustive identification of the EHS training required for personnel within the scope of this guideline.

3.3 Depending on the hazards, additional training or certifications, specific to the task or the area hazards, may be required.

4 Referenced Standards and Documents

4.1 *ANSI Document*¹

ANSI Z490.1 — Criteria for Accepted Practices in Safety, Health and Environmental Training

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

5 Terminology

5.1 *Definitions*

5.1.1 *authorized employee(s)* — persons trained and proficient in performing a hazardous energy isolation (lockout/tagout) procedure on an energy source ensuring that the energy isolating device and the equipment being controlled cannot be operated until the locking device is removed.

¹ American National Standards Institute, Headquarters: 1819 L Street, NW, Washington, DC 20036, USA. Telephone: 202.293.8020; Fax: 202.293.9287. New York Office: 11 West 42nd Street, New York, NY 10036, USA. Telephone: 212.642.4900; Fax: 212.398.0023; <http://www.ansi.org>

5.1.2 *instructor or facilitator* — an individual with appropriate technical expertise and experience, authorized by the employer to deliver, or facilitate the delivery of, a course module or set of modules and capable of addressing student questions in a timely manner.

5.1.3 *learning objective* — written statement of the desired knowledge, skill, or ability to be demonstrated.

5.1.4 *qualified employee(s)* — persons trained and proficient in the equipment and operation to be performed, including recognition of the hazards and necessary protective measures.

5.1.5 *training* — an activity which assists an individual in fulfilling the learning objectives.

6 Core Curriculum

6.1 The employer is responsible for ensuring that the employee's EHS training is based on a needs assessment or the results of hazards analyses. The subject matter in this section is considered the minimum basic curriculum for training personnel within the limitations of this guideline.

6.2 *Housekeeping* — General principles and concepts of hazard recognition and various techniques, procedures or practices for reducing or eliminating risks such as:

- Appropriate use of passageways, storerooms, and service rooms,
- Maintaining walking and working surfaces in a safe, clean, orderly and sanitary condition, and
- Establishing and maintaining aisle width and means of egress.

6.3 *Ergonomics* — General principles and concepts of Ergonomic and Musculoskeletal Disorders (MSD) as they relate to service activities, with special emphasis in the following areas:

- Repetitive motion injuries,
- Video display terminal usage,
- Material handling techniques,
- Recognition of MSD signs and symptoms,
- How to report MSD signs and symptoms and the importance of early reporting,
- Personal MSD risk factors including factors that contribute to MSD of the upper extremities, and back,
- MSD hazards in their jobs and measures for protection against MSD hazards,
- Proper selection and use of tools and equipment, and
- Job-specific controls implemented.

6.4 *Hand and Portable Power Tools*

- Recognition of the hazards associated with the use of hand and portable power tools, and
- Requirements for tool-specific training in the safe use of the tools to be used.

6.5 *Material Handling Equipment*

- Recognition of the hazards associated with operating or working around material handling equipment and mechanical lifting devices such as hoists, pallet jacks, forklifts, and overhead cranes, and
- Restrictions, including additional training and certification requirements, associated with their operation.

6.6 *Robotics*

- Recognition of the hazards associated with working near robots and associated components,
- Restrictions and requirements for robot service or repair, including additional training and certification of service personnel,
- An understanding of the operating envelope and the risks associated with entry, and
- Review of appropriate safe work practices.

6.7 *Confined Space*

- Ability to recognize a confined space,
- Recognition of the hazards associated with confined spaces, and
- Requirements and restrictions for confined space entry including sampling or additional training and certification of service personnel.

6.8 *Elevated Work*

6.8.1 *Fall Protection*

- Recognition of the hazards, both to the worker and other personnel, when performing work in an elevated position, and
- Identification of when additional fall protection measures including training are required.

6.8.2 *Portable Ladders*

- Recognition of the hazards associated with the use of portable ladders, and
- Proper selection, inspection, set-up and use of portable ladders and working platforms in the work area.

6.9 *Walking and Working Surfaces* — General principles and concepts of hazard recognition and various techniques, procedures or practices for reducing or eliminating risks involving:

- Walking and working surfaces, gratings, raised platforms, floor and wall openings,
- Guarding floor and wall openings and holes using covers, guardrails and warning barriers,
- Floor loading and protection, and
- Protection of open-sided floors, platforms, runways, and stairway railings and guards.

6.10 *Electrical Work* — General principles and concepts of performing work on or around electrical circuits as well as instruction in the following areas:

- General electrical safety requirements,
- Recognition of the hazards associated with electrical work,
- Importance of equipment grounding continuity, and
- Restrictions and requirements to qualify service personnel for performing energized electrical work (EEW) including additional procedures, training, and protective measures.

6.11 *Control of Hazardous Energy* — Authorized Employee—Requirements of the Hazardous Energy Control (Lockout/Tagout) Program including:

- Consequences (injury potential and disciplinary action) of failing to comply with the energy control requirements,
- Requirements to ascertain each of the various types and magnitudes of potentially hazardous energy sources, both potential and kinetic, in the system(s) or equipment involved,
- General procedures for performing hazardous energy isolation and the equipment necessary to isolate and control hazardous energies,
- General procedures for re-energizing after completion of work,
- The role and use of equipment-specific procedures,
- Methods of testing and or verifying energy isolation, and
- Periodic program inspection and auditing of program effectiveness.

6.12 *Radiation (Ionizing and Non-Ionizing)*

- Awareness of basic radiation hazards as associated with both ionizing and non-ionizing radiation (e.g., x-ray, ultraviolet, electromagnetic), and
- Restrictions, including additional requirements for training, to qualify service personnel for work with or around hazardous levels of radiation.