

SEMI S16-0307

GUIDE FOR SEMICONDUCTOR MANUFACTURING EQUIPMENT DESIGN FOR REDUCTION OF ENVIRONMENTAL IMPACT AT END OF LIFE

This standard was technically approved by the global Environmental, Health, & Safety Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on November 21, 2006. It was available at www.semi.org in February 2007 and on CD-ROM in March 2007. Originally published June 2000.

NOTICE: This document was completely rewritten in 2007.

1 Purpose

1.1 This document provides design guides to minimize environmental impacts in consideration of end of life of semiconductor manufacturing equipment (SME) or its components.

2 Scope

2.1 This guide addresses design considerations to minimize environmental impact of SME or component disposal at end of life.

2.2 This guide addresses design considerations to encourage reuse or recycling of SME or its components.

2.3 This guide contains the following items:

- Purpose
- Scope
- Limitations
- Referenced Standards and Documents
- Terminology
- General Concept
- Material Selection
- Identification for Reusability or Recyclability
- Design for Reusability or Recyclability
- Documents to be Prepared by the Equipment Supplier

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

3 Limitations

3.1 This guide is not intended to address disposal procedures for SME or its components.

3.2 This guide is not intended to supersede the applicable codes and regulations of the region where SME is used.

3.3 This guide is not intended to be applied retroactively.

3.4 This guide is not intended to be used as a conformance document but intended to be used as a design consideration document.

NOTE 1: SEMI S16-0600 was not developed as conformance criteria for design.

4 Referenced Standards and Documents

4.1 SEMI Standards

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

SEMI S12 — Guidelines for Equipment Decontamination

SEMI S13 — Environmental, Health and Safety Guideline for Documents Provided to the Equipment User for Use with Semiconductor Manufacturing Equipment

4.2 ISO Documents¹

ISO11469 — Plastics; Generic Identification and Marking of Plastic Products

ISO14001 — Environment Management Systems, Specifications with Guideline for Use

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

5 Terminology

5.1 Abbreviations and Acronyms

5.1.1 *SME* — Semiconductor Manufacturing Equipment

5.2 *Definitions* — Definitions defined in SEMI S2, SEMI S12, and SEMI S13 should be referred to except if otherwise specified below.

5.2.1 *component* — an individual piece or a complete assembly of individual pieces that together make up a whole machine, system, etc.

5.2.2 *decontaminate* — to reduce known hazards, primarily chemical residues, to a level that is acceptable as defined by local regulations or industry practice.

5.2.3 *dispose* — to discard an item into a public or private waste management program.

NOTE 2: Local regulations may stipulate specific provisions for disposal.

5.2.4 *disposal party* — a party who disposes of equipment or components.

5.2.5 *environmental aspect* — element of an organization's activities, products or services that can interact with the environment [ISO14001].

5.2.6 *environmental impact* — any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services [ISO14001].

5.2.7 *recycle* — to put to use a part or a material that may have future practical use after serving its particular original purpose and undergoing some manner of industrial reprocessing (e.g., cleaning, crushing, shredding, melting, chemical processing).

5.2.8 *reuse* — to use again for its original purpose after undergoing some manner of reconditioning (e.g., decontamination, cleaning, re-packaging).

6 General Concepts

6.1 The most important time to consider how equipment will be disposed of, and what the environmental impact of the disposal will be, is during the design stage of the equipment.

6.1.1 Significant environmental aspects pertaining to equipment disposal should be identified at the time of equipment design.

6.1.2 The equipment supplier should prepare criteria to judge whether each environmental impact pertaining to equipment disposal is acceptable or not.

6.1.3 It is recommended that the equipment supplier implements design changes necessary to align with the supplier's environmental impact criteria.

6.1.4 A good first-order estimation of the environmental impact caused by equipment disposal is the amount of material left after separation of materials for reuse or recycling. The less non-usable or non-recyclable material there is, the less the environmental impact there will be at the time of disposal.

6.1.5 The amount of materials of construction should be minimized in the equipment to the extent that is practicable without compromising other key equipment characteristics such as functionality and safety.

6.2 Each environmental impact characteristic and related supplier criteria should be documented in a location at the discretion of the supplier. Such document need not be provided to any particular party unless that is mutually agreed to.

6.2.1 Where applicable, the equipment supplier should design the equipment so that its materials, parts, assemblies, or components can be reused, or recycled at end of life.

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