



SEMI M26-96

GUIDE FOR THE RE-USE OF WAFER BOXES AND CASSETTES USED TO TRANSPORT WAFERS

1 Purpose

This document is a guide for box cleaning services, wafer suppliers, and wafer users for the re-use of boxes and cassettes. Its purpose is to encourage the re-use of wafer boxes and cassettes, thereby reducing waste.

2 Scope

None.

3 Referenced Documents

3.1 SEMI Documents

SEMI E1 — Specification for 3", 100 mm, 125 mm, and 150 mm Plastic and Metal Wafer Carriers

SEMI T3 — Specification for Semiconductor Wafer Box Labels

3.2 ANSI Document¹

ANSI/EIA - 556-A — Outer Shipping Container Bar Code Label Standard

4 Terminology

4.1 *box wrap* — The wrapping or bagging applied over the wafer box to comprise the product package.

4.2 *cassette* — A device to hold wafers during transport or processing. Also called *wafer carrier*.

Note: In this guide, the emphasis is on the cassette for holding wafers in transport, not in processing. Cassettes for re-use inside the wafer boxes should not be exposed to processing chemicals nor metal contaminants. (Compare SEMI E1 in which the emphasis is on cassettes to hold wafers during processing.)

4.3 *recycle* — To pass through a cycle or process for the purpose of recovering any useful substances from waste material. Compare with *re-use*.

4.4 *re-use* — To re-employ an article in its original form for a purpose which is the same or similar to its initial purpose.

4.5 *seam tape* — Adhesive-coated tape employed to seal the seam between the cover and the base of a box.

4.6 *secondary packaging* — Packaging materials, molded or unmolded, inside the shipping container, which serve to protect the wafer package from damage during transportation.

4.7 *shipping container* — A carton used to transport wafer boxes; it is typically constructed of corrugated cardboard.

4.8 *wafer box* — A sealable container, consisting of a base and a cover, used for storing or transporting wafers. Compare with transport package in ANSI/EIA 556-A.

4.9 *wafer box label* — The label on the box identifying the product and its manufacturer (see SEMI T3).

5 Suitability for Re-Use

5.1 The ability to re-use wafer boxes and cassettes is adversely affected by certain characteristics. Some of these characteristics also impact on the ability to recycle.

5.1.1 The following characteristics are recommended:

5.1.1.1 generic embossed markings (e.g., model name, model number, manufacturer's information, such as name and location),

5.1.1.2 embossed recycle symbol, trademark symbol, mold markings,

5.1.1.3 embossed instructions,

5.1.1.4 removable labels with low residue, low tack adhesives,

5.1.1.5 removable seam tape with low residue, low tack adhesives,

5.1.1.6 removable methods of identification,

5.1.1.7 stackable wafer box bases and covers,

5.1.2 The following characteristics are not recommended:

5.1.2.1 "custom" embossed markings,

¹ American National Standards Institute, 1430 Broadway, New York, NY 10018



- 5.1.2.2 end-user specific logos, symbols, and markings,
- 5.1.2.3 high residue tape and labels,
- 5.1.2.4 labels which are difficult to remove or are non-removable,
- 5.1.2.5 non-removable marks such as inks and other coloring.

6 Procedural Guidelines

6.1 Collection Method at the Wafer User Facility

- 6.1.1 Unpack shipping containers and save for re-use or recycle.
- 6.1.2 Remove box wrap and seam tape from boxes under a clean air module or in a cleanroom. Exercise care when removing the box wrap; avoid scuffing or cutting the box surface. If recyclable, collect box wrap material and seam tape in designated containers.
- 6.1.3 Remove wafers from box in cleanroom area. Remove all labels from the box.
- 6.1.4 Place boxes and cassettes for re-use in a designated collection container or collection area.
- 6.1.5 Maintain the cassettes and boxes for re-use in an environment free from contact with metal contaminants and process chemicals.
- 6.1.6 Periodically return boxes and cassettes for reclean to the reclean service location or the wafer supplier.
- 6.1.7 Whenever possible, cycle cassettes and boxes between the same wafer user and wafer supplier.

6.2 Box and Cassette Cleaning at the Reclean Service Location

- 6.2.1 The supplier of the reclean service must engineer the reclean process.
- 6.2.2 At the service supplier's option, visually inspect the boxes and cassettes prior to cleaning. The wafer supplier and wafer user should agree to acceptable and unacceptable levels of defects, recognizing that there will be some normal wear. These levels should be provided to the service supplier. Inspect for the following defects:
 - 6.2.2.1 deformation or warp,
 - 6.2.2.2 razor cuts, scuffs, breaks, cracks, voids, and fractures,

- 6.2.2.3 contamination and imbedded silicon,
- 6.2.2.4 damage to tension springs or other wafer retention mechanisms,
- 6.2.2.5 markings and labels.
- 6.2.3 Collect defective parts for recycle, and clean acceptable parts as follows:
 - 6.2.3.1 Clean using an aqueous-based or non-aqueous-based chemistry,
 - 6.2.3.2 Chlorofluorocarbon chemistries are not permitted.
 - 6.2.3.3 Confirm the compatibility of the box and cassette materials with the cleaning method and drying conditions.
- 6.2.4 Visually inspect the boxes and cassettes after cleaning using a high intensity or an ultraviolet light. The wafer user and the wafer supplier should agree to acceptable and unacceptable levels of defects, recognizing that there will be some normal wear. Inspect for all the defects noted in 5.2.2.2 and, in addition, for:
 - 6.2.4.1 residues from labels, markings, or tape,
 - 6.2.4.2 failure of the box halves to seat and seal together.
- 6.2.5 Collect defective parts for recycle.
- 6.2.6 Return acceptable boxes and cassettes to the wafer supplier using box wrap, nesting material, and shipping containers as required to maintain cleanliness and mechanical integrity.

6.3 Maximum Number of Re-Use Cycles

- 6.3.1 Base the total number of re-use cycles on the ability to maintain both mechanical integrity and cleanliness.

Note: By following this guide, some users have found that boxes and cassettes processed through more than four re-use cycles were still satisfactory.

NOTICE: These standards do not purport to address safety issues, if any, associated with their use. It is the responsibility of the user of these standards to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. SEMI makes no warranties or representations as to the suitability of the standards set forth herein for any particular application. The determination of the suitability of the standard is solely the responsibility of the user. Users are cautioned to refer to manufacturer's instruc-